

# FLORA OF ASSAM

BY

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REFERENCE

Not to be lent out  
VOL. II.

CONNARACEÆ TO CORNACEÆ.



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## PREFACE.

The original draft of this Volume (*Calycifloræ*) was completed in 1932 by Mr. P. C. Kanjilal, B.Sc., I.F.S., of the United Provinces. Considerable time has elapsed before this Volume could be taken in hands for publication. During this period many species have been discovered and described and a number of alterations have been made in the nomenclature.

I lost touch with the publication of the Volumes of the "Flora of Assam" since my retirement in December, 1934.

I have now been asked to take up the work of editing and publishing all the remaining Volumes of the "Flora." The task is arduous, specially so, as I am not afforded facilities to consult the herbarium and library of the Royal Botanic Garden, Sibpur. It is impossible to do justice to a work of this nature without facilities for ready reference.

I have since described as many as 40 species, which have been embodied in this work in small types, and in many cases it has not been practicable to include them in the keys without seriously interfering with the progress of printing work.

The following species have appeared in the body of this Volume in their old nomenclature which could not be altered in time:—

CORRECT MODERN NAME.	NAME USED IN THIS VOLUME.
<i>Santaloides caudatum</i> (Planch)	
<i>O. Kuntze.</i>	<i>Rourea caudata</i> Planch.
<i>Indigofera glabra</i> Linn.	<i>I. pentaphylla</i> Linn.
<i>Pongamia pinnata</i> (Linn) Therr.	<i>P. glabra</i> Vent.
<i>Delonix regia</i> Raf.	<i>Poinciana regia</i> Boj.
<i>Prunus Puddum</i> Roxb.	<i>P. cerasoides</i> Don.

CORRECT MODERN NAME.	NAME USED IN THIS VOLUME.
<i>Sorbus cuspidata</i> <i>Hedl.</i>	<i>Pyrus cuspidata</i> <i>Bertol.</i>
<i>Bergenia ligulata</i> (Wall) <i>Engl.</i>	<i>Saxifraga ligulata</i> <i>Wall.</i>
<i>Carallia brachiata</i> (Lour) <i>Therr.</i>	<i>C. integerrima</i> <i>DC.</i> = <i>C. lucida</i> <i>Kurz.</i>
<i>Terminalia tomentosa</i> <i>W. &amp; A.</i>	<i>T. tomentosa</i> <i>Bedd.</i> Var. <i>typica.</i>
<i>Eugenia cumini</i> (Linn) <i>Druce.</i>	<i>E. jambolana</i> <i>Lam.</i>
<i>Psidium Guajava</i> <i>Linn.</i>	<i>P. Guyava</i> <i>Linn.</i>
<i>Rotala indica</i> <i>Kæhne.</i>	<i>Ammannia peploides</i> <i>Spreng.</i>
<i>Rotala rotundifolia</i> <i>Kæhne.</i>	<i>Ammannia rotundifolia</i> <i>Ham.</i>
<i>Epilobium trichoneurum</i> <i>Hausk.</i>	<i>E. Hookeri</i> <i>C. B. Clarke.</i>
<i>Woodfordia floribunda</i> <i>Salisb.</i>	<i>W. fruticosa</i> <i>Kurz.</i>
<i>Mollugo pentaphylla</i> <i>Linn.</i>	<i>M. stricta</i> <i>Linn.</i>
<i>Mollugo lotoides</i> <i>O. Kuntze.</i>	<i>M. hirta</i> <i>Thunb.</i>
<i>Mollugo oppositifolia</i> <i>Linn.</i>	<i>M. Spergula</i> <i>Linn.</i>
<i>Centella asiatica</i>	<i>Hydrocotyle asiatica</i> <i>Linn.</i>
<i>Hydrocotyle sibthorpioides</i> <i>Lam.</i>	<i>H. rotundifolia</i> <i>Roxb.</i>

Some species have been described and put in the addenda as otherwise the publication of this Volume would have been unusually delayed.

I must first gratefully acknowledge the valued assistance of Mr. R. N. De, B.Sc., I.F.S., Forest Botanist, Assam, in his careful reading of the proof and hearty co-operation in every direction.

I am personally indebted to Dr. K. Biswas, M.A., D.Sc., F.R.S.E., and Mr. V. Narayanswami of Royal Botanic Garden, Calcutta, for their ungrudging help in all possible directions.

My grateful acknowledgments are also due to Mr. C. E. C. Fischer of Kew Gardens, for material assistance in revising the nomenclature and incorporating new records and new species from Assam, in this Volume.

It has not been possible to avoid printers' mistakes in spite of repeated proof-reading.

A. DAS.

SHILLONG,  
10th February, 1938.

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## INTRODUCTION.

The materials for this Volume of the "Flora of Assam" were mainly collected by the late Rai Bahadur U. N. Kanjilal, F.L.S. His son, Mr. P. C. Kanjilal, I.F.S., of the United Provinces who was deputed to Assam to act as Botanical Forest Officer wrote the manuscript of this volume and revised his father's descriptions. His successor in office, Mr. A. Das, I.F.S., now retired. described and added some more species.

It is unfortunate that none of these officers are now in service in Assam and to my predecessor, Dr. N. L. Bor, I.F.S., and me as Botanical Forest Officer, has fallen the task of publication of the remaining parts of the "Flora of Assam." I have used my pen freely in correcting all mistakes that have caught my eye and I have been very ably assisted in proof-reading by my Botanical Assistant, Babu Banka Bihari Syam to whom my thanks are due. Every endeavour has been made to eliminate mistakes and it is hoped that some measure of success has been achieved.

R. N. DE, I.F.S.  
*Botanical Forest Officer, Assam.*

SHILLONG,  
14th February, 1938.

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# FLORA OF ASSAM

## CALYCIFLORÆ.

### FAM. 49. CONNARACEÆ.

Mostly woody climbers, rarely erect shrubs, more rarely trees. *Leaves* alternate, imparipinnate or 1-3-foliolate, exstipulate; leaflets quite entire. *Flowers* usually 2-sexual and regular, 5-merous, in racemes or panicles. *Calyx* imbricate or valvate, usually persistent. *Petals* narrow, free or nearly so. *Disk* obsolete. *Stamens* 10, 5 against and 5 between the petals, the former usually shorter and imperfect; filaments generally connate at the base. *Carpels* 5, each usually with 2 collateral ovules, usually only one carpel developing into fruit. *Fruit* of one, rarely 2, 1-seeded 2-valved follicular capsules; seed 1, often arillate, exalbuminous; radicle superior.

Calyx accrescent, lobes orbicular. Follicle sessile. . . . .	1. Rourea.
Calyx not accrescent, lobes elongate. Follicle stipitate. . . . .	2. Connarus.

#### 1. ROUREA Abul.

*Leaves* imparipinnate; leaflets sub-opposite or alternate. *Flowers* small in axillary panicles. *Sepals* 5, orbicular, imbricate, much enlarged in fruit. *Petals* 5, usually oblong. *Carpels* 5, only 1 perfect. *Capsule* sessile, curved or crescent-shaped; seed solitary, erect, arillate, exalbuminous.

Leaflets subcoriaceous, sepals not ciliate, much shorter than the petals; follicle usually much curved. . . . .	1. <i>R. commutata</i> .
Leaflets chartaceous. Sepals slightly ciliate, about as long as the petals; follicle slightly curved and obliquely oblong. . . . .	2. <i>R. caudata</i> .

### 1. *Rourea commutata* Planch.

A large glabrous evergreen scandent shrub. *Leaves* 8-12 in. long; common petiole stout, terete. *Leaflets* usually 5-9, rarely up to 13, more or less alternate, 3-7 by .8-2.5 in., oblong to ovate lanceolate, more or less rounded or subacute at the base, abruptly acuminate with a blunt tail, subcoriaceous, shining on both surfaces; main lateral nerves 3-5 on either half, anastomosing near the margin and with many shorter intermediate ones, the lower two much arched and extended up to the middle of the leaflet often even beyond; petiolules .1-.2 in. long, stout. *Flowers* white, small, in much branched axillary panicles. *Sepals* about .08 in. long, orbicular or slightly ovate. *Petals* about 1.5 in. long, obovate-oblong. *Styles* recurved, longer than the petals. *Follicles* about 1 in. long, oblique, curved and tapering to a point, opening by the inner suture; seed about .7 in. long, oblong, completely enveloped by a bright red aril.

Occurs in evergreen forests of the LAKHIMPUR and SIBSAGAR DISTRICTS, also in the KHASI HILLS.

The aril of the ripe fruit is eaten.

Flrs. 5-6. Fr. 7-8.

### 2. *Rourea caudata* Planch.

A woody climber very similar in appearance to the foregoing species. *Common petiole* more slender; leaflets thinner, slightly smaller, with a longer tail; main lateral nerves up to about 8 on either half. *Panicles* axillary, fascicled, 2-5 in. long; pedicels capillary, .2-.3 in. long. *Sepals* about .15 in. long, ovate-oblong, ciliate, enveloping the petals. *Style* much exceeding the petals. *Follicle* somewhat smaller, obliquely oblong, only slightly curved, clasped at the base and for about a third of its length by the accrescent calyx.

KHASI and JAINTIA HILLS, e.g., near Mynso, also NOWGONG, SIBSAGAR and the DUFFLA HILLS.

Flrs. 9-11. Fr. 12-2.

## 2. CONNARUS Linn.

*Connarus paniculatus* Roxb. Vern. *Makoi-lata*, Ass., *Kobelahu*, *The-phlop-phlop*, *Rikang-tomdak*, Mik.; *Hlu-plu*, *Met-puk*, *Lushai*.

A large woody climber. *Bark* rough, dark-brown or black, yellowish to reddish inside according to age. *Leaves* imparipinnate; rachis .3-7.5 in. long, terete. *Leaflets* 3-7, usually 5, 3-8 by 1-2.5 in., elliptic lanceolate or oblong, bluntly short-acuminate, quite entire, thinly coriaceous, perfectly glabrous and shining, subacute or slightly rounded at base; main lateral nerves 5-7 on either half, very oblique and much arched, slender; petiolules .2-.3 in. long, very stout. *Flowers* white, .2-.3 in. long, cymosely arranged on the branches of rusty pubescent, mostly terminal panicles 5-12 in. long; pedicels up to .1 in. long; bracts minute. *Calyx* lobes .5 in. long, imbricate, oblong, thick and persistent but not accrescent in fruit, pubescent outside. *Petals* twice as long as the calyx, linear oblong, narrowed towards the base, membranous, nearly glabrous, dull-white. *Stamens* 10, alternately much shorter and sterile; filaments pubescent. *Carpels* 5, 4 imperfect, the 5th with a slender style, villous. *Follicles* 1.2-1.5 by .6-.8 in., inflated, slightly compressed, on a thick stipe and supported by the persistent calyx, shining and obliquely striated outside; valves more or less pubescent inside. *Seed* black, .7-.9 by .5-.6 in., much compressed; aril small, reaching about a quarter of the length of the seed, with a crenate margin; cotyledone oily.

Fairly common throughout the plains and up to 4,000 ft., in the HILLS, generally in evergreen types of forest.

The oil of the seeds may be found suitable for soap-making.

Flrs. 2-4. Fr. 3-5.

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## FAM. 50. LEGUMINOSÆ.

Trees, shrubs or herbs. *Leaves* alternate, usually compound, stipulate. *Flowers* 2-sexual, regular or irregular, bracteate, arranged singly or in heads, on simple racemes or panicles of racemes, rarely in single heads. *Sepals* 5, usually connate, often 2-lipped, rarely free, odd lobe usually anterior. *Petals* 5, rarely the 5th suppressed, free, but usually combined when the flowers are in heads. *Stamens*

normally 10, sometimes fewer by suppression or indefinite when the flowers are in heads; filaments free or variously combined; anthers 2-celled with longitudinal dehiscence. *Ovary* free, often stipitate; carpel solitary; ovules on the ventral suture of the carpel. *Fruit* a legume (pod), usually dehiscent along one or both sutures. *Seeds* flat or more or less compressed, generally exalbuminous; testa horny or coriaceous.

This very large and important Family is divided into three Sub-families :—

- |   |                   |
|---|-------------------|
| Flowers irregular. Petals unequal, free, imbricate; stamens up to 10 :—   |                   |
| Stamens diadelphous, less frequently free or monadelphous; calyx gamosepalous; petals descending, imbricate (posterior petal outermost) usually largest | 1. Papilionatæ.   |
| Stamens free; calyx divided to or nearly to the base; petals ascending, imbricate (posterior petal innermost).  | 2. Cæsalpinioidæ. |
| Flowers regular. Petals equal, more or less connate, valvate; stamens usually indefinite.   | 3. Mimosoidæ.     |

#### Sub-family 1. PAPILIONATÆ. (Leguminosæ)

Herbs, shrubs or trees. *Leaves* usually pinnate, less commonly digitate, rarely simple; leaflets often stipellate. *Flowers* 2-sexual, irregular and of the characteristic papilionaceous type, as described below. *Calyx* gamosepalous, 2-lipped. *Corolla* of 5-imbricate petals, which are more or less clawed, the two innermost (which are also anterior) similar, free or connate into a more or less boat-shaped sheath encasing the ovary; these are called *keel* petals. The next two petals are immediately outside the keel, also similar and are called the *wings*. The fifth is the outermost or odd petal called the *standard*, which is posterior in position and generally broader than the others and reflexed. *Stamens* generally 10, diadelphous, sometimes monadelphous, rarely all free, inserted with the petals on the calyx-tube; anthers often versatile. *Pod* dry, generally dehiscent, sometimes indehiscent. *Seeds* exalbuminous or albuminous.

## Artificial key to the Papilionatæ.

- Tribe I. **PODALYRIÆ.** Stamens free. Pod  
dehiscent, leaves digitate :—  
A shrub; stipules connate. . . . 1. *Piptanthus.*
- Tribe II. **GENISTEÆ.** Herbs or shrubs.  
Leaves simple or digitately trifolio-  
late; leaflets entire; stamens mona-  
delphous; pod dehiscent, not  
jointed :—  
Pods flattened. A shrub. . . . 2. *Priotropis.*  
Pods turgid. Herbs or under-  
shrubs. . . . 3. *Crotalaria.*
- Tribe III. **TRIFOLIÆ.** Herbs; leaves 3 folio-  
late; leaflets toothed :—  
Flowers blue; petals early deci-  
duous; a trailing herb. . . . *Parochetus.*
- Tribe IV. **GATEGEÆ.** Herbs or shrubs,  
sometimes climbing; leaves impari-  
pinnate; leaflets usually entire;  
stamens usually diadelphous; pod  
dehiscent, not jointed; stipellæ  
usually absent :—  
I. Hairs fixed by the middle;  
anthers apiculate. . . . 4. *Indigofera.*  
II. Hairs basifixed; anthers obtuse :—  
A. Pods flattened, continuous;  
leaves imparipinnate :—  
Pods tardily dehiscent;  
shrubs or climbers. . . . 5. *Millettia.*  
Pods soon dehiscing . . . . 6. *Tephrosia.*  
B. Pods long, slender, sep-  
tate; leaves usually pari-  
pinnate; inflorescence  
axillary. . . . 7. *Sesbania.*
- Tribe V. **HEDYSARÆ.** Herbs or shrubs,  
sometimes climbing; leaves usually  
imparipinnate, (exc. *Smithia*) rarely  
1-foliate; stamens diadelphous or  
monadelphous; pod jointed or  
1-seeded :—  
I. Leaflets not stipellate :—  
A. Stamens in bundles of 9  
& 1; ovule solitary. . . . 8. *Lespedeza.*  
B. Stamens in bundles of 5+5 :—  
Joints of pod folded  
inside calyx. . . . 9. *Smithia.*  
Pod straight, exerted. . . . 10. *Æschynomene.*  
II. Leaflets stipellate :—  
A. Pods twisted up inside the  
calyx. . . . 11. *Uria.*

- B. Pods not twisted up inside the calyx. . . . 12. *Desmodium*.

Tribe VI. *VICIEÆ*. Climbers or low herbs; leaves paripinnate, ending in a bristle or tendril; stamens diadelphous or monadelphous by abortion; pod not jointed, dehiscent :—  
 Stamens 9, (the posterior absent); a climber. . . . 13. *Abrus*.

Tribe VII. *PHASEOLEÆ*. Usually climbers, rarely trees or erect shrubs; leaves pinnately 3-foliolate (digitate in *Flemingia*), stipellate—or exstipellate and then gland-dotted; pods not jointed, dehiscent; stamens 1-2 adelphous :—

I. Leaves not gland-dotted :—

A. Nodes of raceme not tumid; petals about equal in length; style not bearded :—

1. Stamens diadelphous, all fertile; stipules and bracts persistent :—  
 Style filiform. Calyx teeth distinct. . . . 14. *Shuteria*.

Style flattened upwards. Calyx truncate. . . . 15. *Dumasia*.

2. Stamens monadelphous, alternately sterile and short; stipules and bracts minute, caducous. 16. *Tetramnus*.

B. Racemes tumid at the nodes; style not bearded :—

1. Petals very unequal :—

Climbers; keel exceeding the wings and the standard. . . . 17. *Mucuna*.

Trees or undershrubs; standard exceeding the keel. . . . 18. *Erythrina*.

2. Petals about equal in length :—

a. Stamens diadelphous :—

- i. Pods not winged, 1-seeded, dehiscent at the 1-seeded tip only :—



- Flowers large,  
showy, usually  
in racemes. . . 19. *Butea*.  
Flowers small,  
usually  
panicked. A  
sinistorse  
climber. . . 20. *Spatholobus*.
- ii. Pod winged,  
many seeded,  
tardily dehiscent. 21. *Mastersia*.
- b. Stamens monadelph-  
ous :—  
Upper lip of  
calyx projecting;  
lobes connate. . . 22. *Canavalia*.  
Calyx teeth sub-  
equal, upper con-  
nate :—  
Pod oblong, tur-  
gid, 1-2 seeded. 23. *Dioclea*.  
Pod linear, flat,  
many seeded. . . 24. *Pueraria*.
- C. Racemes usually tumid at  
the nodes; style bearded :—  
1. Stigma oblique :—  
a. Keel spirally beaked :—  
Keel forming com-  
plete spiral; pod  
more or less com-  
pressed. . . 25. *Phaseolus*.  
Keel beaked but  
not forming a  
spiral; pod sub-  
terete. . . 26. *Dysolobium*.  
b. Keel incurved, some-  
times slightly twist-  
ed. . . 27. *Vigna*.
2. Stigma terminal :—  
Petals about equal in  
length. . . 28. *Dolichos*.  
Petals very unequal  
in length; flowers  
showy. . . 29. *Clitoria*.
- II. Leaves gland dotted; stipellæ  
often abortive; nodes or  
racemes not tumid :—  
A. Ovules 1-2; pod not de-  
pressed between the seeds :—

- Leaves digitately 3-foliate or 1-foliolate. Pod turgid. Erect or prostrate under-shrubs. .. 30. Flemingia.
- Leaves 1 foliolate; pod flattened. Erect under-shrub. .. 31. Eriosema.
- B. Ovules 3 or more :—
1. Pod without depressed lines between the seeds. .. 32. Dunbaria.
2. Pod with depressed lines between each seed :—
- Seed with a large grooved strophole. .. 33. Atylosia.
- Seed without strophole. .. 34. Cajanus.
- Tribe VIII. DALBERGIEÆ. Trees or shrubs, sometimes scandent; leaves imparipinnate; stamens 1-2adelphous; pod indehiscent :—
- Leaflets alternate. .. 35. Dalbergia.
- Leaflets opposite :—
- Pods thick, almost woody, not winged. .. 36. Pongamia.
- Pods thin, firm, winged down one or both sutures. .. 37. Deerris.
- Tribe IX. SOPHOREÆ. Shrubs or trees; leaves imparipinnate, rarely simple; stamens free :—
- A. Leaves simple. Bract and bracteoles large, opposite, persistent. .. 38. Dalhousiea.
- B. Leaves odd pinnate; bracts or bracteoles small :—
- Pod moniliform; stigma terminal. .. 39. Sophora.
- Pod turgid, dehiscent; stigma oblique. .. 40. Ormosia.

# 1. PIPTANTHUS D. Don.

## Piptanthus nepalensis D. Don.

A shrub 8 to 12 ft. high, somewhat gregarious in habit. Branches green, angled or with vertical ridges and annulate with scars of fallen stipules; young shoots silky. *Leaves* digitately 3-foliolate; common petiole .7-1.5 in. long; stipules connate, opposite the petioles .2-.3 in. long, broadly

triangular, pubescent, drying brownish-grey. *Leaflets* sessile, 1.4 by .3-1 in., lanceolate or narrow elliptic, acuminate, entire, dark-green above, pale beneath and adpressed, grey pubescent when young, soon glabrate; midrib prominent beneath; main lateral nerves 8-12 on either half, faint. *Flowers* yellow, about 1.25 in. long, in short compact hairy racemes, 4-5 in. long; peduncles triquetrous; pedicels .5-.7 in. long; bracts ternate, tomentose. *Calyx* about .5 in. long, campanulate, tomentose outside, deciduous from the base. *Petals* bright yellow, all clawed, 1 in. long including the claw which is about .5 in. long; standard erect, blade orbicular, notched, margins reflexed; wings obovate about as long as the blunt slightly incurved keel. *Stamens* 10, free, equal or subequal; anthers uniform. *Ovary* linear, hairy. *Pod* 3-5 by .4-.5 in., flat, continuous within, narrowed at both ends, stipe .8-1 in. long. *Seeds* 3-10.

KHASI HILLS—Shillong-Jawai Road, *Prain*, -Laitlongkot, Manipur-Watt. Deserves a place in gardens for the beautiful golden-yellow flowers.

Fls. 3-5. Fr. 9-11.

## 2. PRIOTROPIS W. & A.

**Priotropis cytisoides** W. & A. Vern. *Dieng-sha-ratoth*, *Dieng-sha-ratoth-balih*, Synt.; *Dieng-sia-kurie* or *chakuriao*, *Dieng-toh-tari*, Khasi.

A shrub usually 6-8 ft. high, somewhat bushy in habit; branchlets, petioles and inflorescence adpressedly grey silky. *Leaves* 2-5 in. long; common petiole .5-1.5 in. long, slender, slightly channelled; stipules very short, subulate, deciduous. *Leaflets* 3, .5-2.5 by .4-1 in., oblong elliptic to lanceolate, acute at both ends; apex mucronate, entire, membranous, glabrous except along the midrib above, minutely adpressed silky beneath; midrib rounded; main lateral nerves about 8-10 on either side of the midrib, anastomosing near the margin; petiolules .05-.1 in. long; stipules minute and setaceous or 0. *Racemes* leaf-opposed or terminal, 3-5 in. long, shortly stalked, densely 10-50 flowered; pedicels about .25 in. long. *Calyx* campanulate, hairy outside, supported by a pair of bracteoles: teeth subequal. *Corolla* much exserted, pale-yellow, turning at least the standards and

wings purplish brown; standard orbicular or broad-obovate, mucronate, about .5 in. across, abruptly reflexed from the claw with two gland-like swellings at the junction of the claw, which is concave and densely silky within except at the base; wings .3 in., obliquely oblong-ovate or obovate; keel with a long pointed ascending beak exceeding the wings, clawed, ciliate towards the base; all petals finely purple veined. *Stamens* monadelphous; anthers dimorphous, 5 with small rounded and 5 with large oblong anthers. *Ovary* stalked and usually bearded along the ventral surface; style long, abruptly bent, bearded towards the top on the inner side; stigma roundish. *Pods* stalked, 1-1.5 by .4-.5 in., obliquely obovate-oblong, flat but somewhat turgid, tipped by the remains of the style, continuous inside, finely veined, minutely adpressed hairy; seeds 2-8, reniform, flattish, tan-brown when mature, on long slender straight funicles.

KHASI and JAINTIA HILLS 3-6,000 ft. in glades and grass-lands; also along the waterless belt along the foot of the Himalayas in GOALPARA and KAMRUP.

Fls. 4-8. Fr. 8-10.

### 3. CROTALARIA Linn.

Herbs and shrubs. *Leaves* simple or 3-foliolate, rarely 3-7 foliolate (in a few South Indian species). *Flowers* yellow, blue or purplish, in terminal or leaf opposed lax racemes. *Calyx* tube short; teeth subequal or connate and 2-lipped. *Corolla* exserted or equalling the calyx; standard generally orbicular, clawed; wings narrower and shorter; keel as long as the wings but broader, connate, much incurved, sharply beaked. *Stamens* monadelphous, forming a sheath of nine filaments open in front; anthers alternately versatile and basifixed. *Ovary* linear, sessile or stipitate, usually many-ovuled; style long, abruptly incurved at the base, bearded; stigma minute, oblique. *Pod* straight, linear or oblong, continuous within, turgid; seeds usually with a long funicle.

#### 1. *Leaves* simple :—

##### A. Low herbaceous plants :—

##### 1. *Corolla* yellow :

Leaves oblong, up to 1 in. in length; stipules minute, not decurrent; pod .25 in. long. ..

1. *C. humifusa*.

- Leaves obovate, up to 2 in. in length; stipules decurrent; pod 1 in. long. . . . . 2. *C. ferruginea*.
- Leaves oblong, up to 3 in. in length; stipules persistent, not decurrent; pod 1·2 in. long. . . . . 3. *C. mysorensis*.
2. Corolla light blue :—  
Leaves linear obovate, up to 6 in. in length; stipules minute, not decurrent; Pod 7 in. long. . . . . 4. *C. sessiliflora*.
- B. Middle sized perennials :—
1. Corolla yellow :—  
Branches winged with decurrent stipules; racemes lateral; pod stalked. . . . . 5. *C. alata*.
- Branches tetragonous, racemes terminal and lateral; pod shortly stalked. . . . . 6. *C. tetragona*.
- Branches terete, sulcate; racemes terminal and lateral; pod sessile. . . . . 7. *C. juncea*.
2. Corolla blue :—  
Branches terete; racemes terminal; pod sessile. . . . . 8. *C. occulta*.
- C. Generally large perennials or under-shrubs :—  
Flowers in terminal heads; corolla blue; pod sessile. . . . . 9. *C. capitata*.
- Flowers in terminal racemes; pod stalked :—  
Bracts persistent; stipules leafy, persistent. . . . . 10. *C. sericea*.
- Bracts minute, subpersistent; stipules minute, caducous. . . . . 11. *C. assamica*.
- II. Leaves 3-foliolate. Racemes terminal and lateral; corolla yellow :—  
Pod tetragonous, sessile, silky, 2-seeded. . . . . 12. *C. trifoliatrum*.
- Pod cylindrical, stalked, glabrous, 20-30 seeded. . . . . 13. *C. striata*.

### 1. *Crotalaria humifusa* Grah.

A much-branched slender herb clothed with dun-brown silky hairs. *Leaves* simple, nearly sessile, up to 1 in. in length, oblong, symmetrical, membranous, glaucous beneath; stipules minute, subulate. *Racemes* leaf-opposed, 1·5-3 in. long, arched, 3-6 flowered; bracts minute. *Calyx* long-

toothed, concealing the small yellow corolla. *Pod* stalked, .2-.3 in. long, oblong, glabrous, 6-8 seeded.

In grass lands up to 5000 ft. in the KHASI HILLS.

## 2. *Crotalaria ferruginea* Garh.

A much branched fairly robust herb; branches conspicuously winged with persistent decurrent stipules, velvety or shaggy. *Leaves* simple, subsessile, 1-2 by .7-1 in., obovate-oblong, obtuse or rounded at the apex; stipules decurrent, persistent. *Racemes* leaf-opposed, 3-6 in. long, long-peduncled, laxly 2-8 flowered; bracts persistent. *Calyx* about .5 in. long, velvety. *Corolla* yellow, more or less included. *Pod* about 1 in. long, linear-oblong, glabrous, 20-30 seeded.

Fairly common in some parts of the plains of UPPER ASSAM. Var. *pilosissima* Benth.—has larger leaves and flowers and is more densely silky; found in the KHASI HILLS, 3-5000 ft.

## 3. *Crotalaria mysorensis* Roth. Vern. *Lao-soh-mynkhar*, *Khasi*.

A densely silky diffuse herb, 1-2 ft. high. *Leaves* simple, 1-3 in. long, oblong-elliptic or elliptic ovate, rounded at both ends, membranous, gland dotted, sparsely covered with long patent hairs; petiole very short; stipules .2-.3 in. long, lanceolate, not decurrent. *Racemes* terminal or sub-terminal, 4-9 in. long, long peduncled, 6-9 flowered. *Calyx* about .5 in. long, clothed with long silky hairs. *Corolla* yellow, hardly exerted. *Pod* about 1 in. long, oblong, glabrous, 20-30 seeded.

Grass-lands, specially in the HILLS; e.g., Nongston, KHASI HILLS, up to 5000 ft.

Flrs. rainy season. Fr. autumn.

## 4. *Crotalaria sessiliflora* Linn.

A robust perennial herb up to 7 ft. in height with ascending strigose branches. *Leaves* simple, 2-6 by .5-.8 in., linear-lanceolate, narrowed at both ends, subcoriaceous, somewhat scabrid and sparsely hirsute above, thinly silky pilose underneath; petiole .1 in. long or less; stipules setaceous, minute. *Flowers* in racemes up to 9 in. in

length or solitary from axils of leaves, deflexed, or shortly petioled; bracts and bracteoles persistent. *Calyx* about .5 in. long, deeply divided; lobes unequal, densely silky, accrescent in fruit. *Corolla* bluish-white, not exserted. *Pod* about .7 in. long, oblong, glabrous, 10-15 seeded.

Along water courses or margins of swamps in the KHASI HILLS, specially in the Jowai Sub-Division

Flrs. 8-9. Fr. 10-11.

### 5. *Crotalaria alata* Ham.

A suberect undershrub about 2 ft. high. *Leaves* simple, 1-3 in. long, obovate or ovate-oblong; apex rounded or acute, mucronate, entire, membranous, silky pubescent beneath; base often unequal; petiole very short; stipules decurrent along the internodes and ending as stiff pointed triangular flaps below the leaves. *Racemes* leaf-opposed, 2-3 flowered; peduncle long, often leafy; bracts small, persistent. *Calyx* about .4 in. long, silky, bracteolate. *Corolla* pale yellow, included. *Pod* stalked, 1.2-1.8 in. long, linear-oblong, narrowed into a stalk at base, glabrous, 30-40 seeded.

Grass lands in UPPER ASSAM and KHASI HILLS up to 5,500 ft.

Fls. and Fr. 12-2.

### 6. *Crotalaria tetragona* Roxb.

A shrub up to 6 ft. in height with 4-gonous stem and sulcate silky branches. *Leaves* 4-12 by .5-1 in., linear or lanceolate very gradually narrowed to the cuspidate tip, membranous or subcoriaceous, green and thinly pilose above, pale and densely silky pilose beneath; lateral nerves very oblique; petiole stout, .1-1.5 in. long; stipules minute, setaceous or 0. *Racemes* simple, mostly terminal, 6-10 in. long, laxly 4-10 flowered; bracts setaceous, flowers handsome, lemon yellow; pedicels up to .5 in. long. *Calyx* about .7-1 in. long, densely brown-velvety; teeth very long, breaking off in the pod. *Corolla* glabrous, slightly exserted. *Pod* subsessile, 1-2 in. long, .4-.5 in. diam., oblong, persistently brown-velvety. *Seeds* 12-20, about .15 in. long, glossy dark-brown.

Grass-lands in the plains and lower hills in the drier parts of the PROVINCE.

Flrs. 9-10. Fr. 11-12.

**7. *Crotalaria juncea* Linn.** Vern. *San*. Hind. & Beng. (-Sunn); *Ausa*, Ass.

A shrub 5 or 6 ft. high, somewhat resembling the foregoing species with ascending terete but sulcate stiff and slender silky branches. *Leaves* 1·5-3·5 in. long, linear to obovate-oblong, obtuse or subacute, subcoriaceous, covered with silky hairs on both surfaces; petiole very short; stipules minute or 0. *Racemes* simple, mostly terminal up to 12 in. long, laxly 10-20 flowered; bracts minute. *Calyx* about 1 in. long, brown-velvety. *Corolla* bright yellow, glabrous, slightly exserted. *Pod* 1·1-3 in. long and about ·4 in. across, rusty-velvety. *Seeds* 10-15, brown.

Cultivated for its fibre in SYLHET and GOALPARA in ASSAM and almost universally in the plains of other provinces.

Flrs. 12-1. Fr. 2-3.

**8. *Crotalaria occulta* Grah.**

A small undershrub 2-3 ft. high having the general look of a stunted *C. sessiliflora*, with ascending branches and adpressed silky hairs. *Leaves* simple, 1·5-3 by ·3-·7 in., cuneately obovate or oblanceolate, subcoriaceous, substrigose and sometimes sparsely pilose along the midrib above, glaucous and more or less densely grey-silky beneath; petiole scarcely ·1 in. long; stipules minute, setaceous. *Racemes* terminal, peduncled, 3-7 in. long, 6-20 flowered; bracts minute. *Flowers* delightfully scented like violets. *Calyx* ·5-·6 in. long, densely brown silky. *Corolla* sky-blue, with darker blue or purple veins, glabrous, as long as or slightly exceeding the calyx. *Pod* about 1 in. long, ·25 in. broad, glabrous. *Seeds* 10-15, about ·07 in. long, kidney-shaped, glossy-brown.

Grass-lands in the hills up to 5,500 ft. Well worth cultivating in gardens for the sake of its scented flowers.

Flrs. 8-9. Fr. 9-10.



**9. *Crotalaria capitata* Benth.**

A bushy cæspitose shrub; stems scarcely branched. *Leaves* simple, 1.1-5 in. long, obovate or oblanceolate, subacute or rounded at the tip, subcoriaceous, green and glabrate above, silky beneath; stipules 0. *Flowers* violet blue in terminal heads or congested racemes of 6-20 flowers; bracts and bracteoles small, persistent. *Calyx* .5 in. long, densely brown-silky. *Pod* sessile, glabrous, not exceeding the calyx.

KHASI HILLS, 5-6,000 ft.

Flrs. 8-9. Fr. 9-11.

**10. *Crotalaria sericea* Retz. Vern. *Jhumjhum*i, Beng., *Atasi*, Sans.**

A shrub 5-7 ft. high; branches striated, sometimes sharply tetragonous, subglabrous or clothed with short silky hairs. *Leaves* simple, 3-6 by 1.7-3 in., obovate-oblong to oblanceolate, subcoriaceous but soft, glabrous or very minutely pubescent above, finely silky beneath; lateral nerves 7-9 on either half, oblique; base cuneate; petiole .2-.4 in. long; stipules falcate or deltoid, leafy, persistent. *Racemes* generally terminal, up to a foot long, 20-40 flowered; peduncles stout, angled; bracts ovate, foliaceous or sometimes setaceous. *Calyx* about .5 in. long with subulate teeth, subglabrous. *Corolla* much exserted, yellow or purplish. *Pod* 2 in. long, nearly .5 in. diam., thinly silky. *Seeds* 20-40, kidney-shaped, imbricating, in two rows.

Grass-lands in swampy localities in GOALPARA, possibly throughout LOWER ASSAM.

Flrs. and Fr. 10-3.

**11. *Crotalaria assamica* Benth.**

A shrub resembling the foregoing species in general appearance; branches stout, finely striated, silky. *Leaves* 2-5 by .5-1.2 in., oblanceolate-oblong; apex obtuse or subacute, mucronate, thinly coriaceous, glabrous, but somewhat rugose above, very finely silky underneath; base cuneate; petiole .1-.2 in. long. *Racemes* terminal, about a foot long, 20-30 flowered; bracts and bracteoles minute. *Calyx* .5-.65 in.

long, pubescent with lanceolate teeth. *Corolla* .7-.9 in. long, golden yellow. *Pod* about 2 in. long and .65 in. across, above the middle, oblanceolate in outline, glabrous, distinctly stalked, many-seeded.

Plains of ASSAM and flats in the Jowai Sub-Division, KHASI HILLS.

Flrs. and Fr. cold season.

## 12. *Crotalaria trifoliastrum* Willd.

A perennial plant 2-3 ft. high, with numerous downy ascending branches. *Leaves* 3-foliolate; common petiole 1-1.2 in. long; stipules minute, setaceous. *Leaflets* .5-1 in. long, obovate-oblong, obtuse or emarginate, membranous, glabrous above, silky beneath. *Racemes* terminal and lateral up to 6 in. in length, 12-40 flowered; bracts minute. *Calyx* .12 in. long with linear teeth, silky. *Corolla* about .25 in. long, yellow, glabrous. *Pod* about .15 in. long, quadrangular, thinly silky, 2-seeded.

Believed to occur in the plains of both VALLEYS.

**13. *Crotalaria striata* DC.** Vern. *Ghantakaran*, Ass. (Upp. Ass.); *Jhunjhunia*, Ass. (Kam.).

A low shrub 2-4 ft. high, somewhat gregarious in habit; branches sulcate, obscurely silky. *Leaves* 3-foliolate; common petiole 2-3 in. long, slender; stipules minute, deciduous. *Leaflets* 1.5-4 in. long, obovate-oblong, obtuse or acute, membranous, green and glabrous above, pale and obscurely silky beneath; petiolules .1-.15 in. long. *Racemes* terminal and lateral, 6-12 in. long, 20-50 flowered; bracts subulate, up to .2 in. long, caducous. *Calyx* .25 in. long; teeth as long as the tube. *Corolla* about .5 in. long, yellow, striped with red, glabrous. *Pod* 1.5-2 in. long, about .25 in. across, cylindrical, glabrous. *Seeds* 20-30, about .1 in. long, kidney-shaped, tan-brown, shining.

Common and gregarious in dry gravelly or sandy beds of streams in the plains, specially in UPPER ASSAM.

The stem is capable of yielding fibre similar to the 'Sun' fibre (*Crotalaria juncea*).

Flrs. and Fr. 10-12.

## PAROCHETUS Hamilt.

**Parochetus communis** Hamilt.

A slender creeping herb with tufted runners. *Leaves* digitately 3-foliolate; petiole usually 2-3 in. long, filiform. *Leaflets* 3, subsessile, .5 by .5 in., broadly obovate-obtriangular or obcordate, slightly emarginate at the apex, mucronate, membranous, green and glabrous above, grey-silky beneath, ciliate. *Peduncles* 3-4 in. long, 1-2 flowered, filiform, with a pair of lanceolate bracts about an inch below the flowers, hairy above the bracts. *Calyx-tube* .25 in. long, deep, campanulate, reddish-brown, hairy outside; teeth lanceolate. *Corolla* .6-.8 in. long, blue with reddish veins; standard obovate, clawed, wings and keel much shorter than the standard. *Stamens* 2-adelphous; anthers uniform. *Style* elongated, glabrous, suddenly incurved above the base. *Pod* about 1 in. long, linear, straight, glabrous, continuous within.

Trailing on road-sides and forest paths above 4,000 ft. in the HILLS, conspicuous for its beautiful flowers. When not in flower bearing a superficial resemblance to an *Oxalis*.

Flrs. 9-10. Fr. 10-11.

## 4. INDIGOFERA Linn.

Herbs, undershrubs or shrubs with laterally attached hairs, occasionally intermixed with basifixed hairs. *Leaves* imparipinnate, rarely 1-foliolate or digitately 3-foliolate, leaflets usually opposite, stipules small; stipels setaceous, minute, caducous or 0. *Flowers* in axillary racemes. *Calyx* campanulate; teeth minute, subequal or the lowest longest. *Petals* purple or pink, caducous; standard ovate, obovate or orbicular, sessile or clawed; wings oblong; keel spurred on each side near the base, often slightly adnate to the wings. *Stamens* all fertile, 2-adelphous, 9 forming a sheath behind the keel, the tenth free and opposite the standard; anthers uniform, connective apiculate. *Ovary* sessile, usually many ovuled; style short, incurved, beardless; stigma capitate, usually penicillate. *Pod* usually linear-cylindrical, straight or curved, turgid, muricated, septate between the seeds. *Seeds* globose or cylindrical, often truncate.

## I. Leaves imparipinnate :—

## A. Flowers in racemes :—

## 1. Pods straight :—

## a. Leaflets more than 7 not glandular hairy, mostly shrubby :—

## i. Bracts 0; racemes lax frd.; leaflets 13-19, pod 6-8 seeded, turgid, 1-1.5 in. long. . .

.. 1. *I. leptostachya*.

- ii. Bracts minute, shorter than the calyx; racemes many frd.; pod very long (for the genus) 2·5-3 in.—15-20 seeded, beaked. .. 2. *I. galegoides*.
- iii. Bracts exceeding the buds :—  
 \* Flowers mostly over ·3 in. long :—  
 Racemes many frd., dense; bracts lanceolate; leaflets 11-17. Pod 1·1-5 in. long. 6-10 seeded. .. 3. *I. atropurpurea*.  
 Racemes many frd.; bracts boat-shaped; leaflets 13-21, large, usually over ·6 in. long, obovate oblong. Pod 1·1-5 in. long. 8-12 seeded with broad sutures. .. 4. *I. pulchella*.  
 Racemes 15-25 frd.; bracts lanceolate; leaflets 15-51, small, under ·6 in. long, narrow-oblong. Pod 1·1-5 in. long, 8-12 seeded with very broad sutures. 5. *I. Dosua*.  
 \* \* Flowers mostly small, about ·25 in.; racemes many frd.; leaflets 9-15. Pod 6-8 seeded with broad sutures. .. 6. *I. nigrescens*.
- b. Leaflets 7-9, glandular hairy :—  
 Racemes 6-12 frd. Pod 10-12 seeded. A caespitose undershrub. .. 7. *I. viscosa*.
- c. Leaflets 3-5; racemes few frd.; undershrubs or subherbaceous plants :—  
 Racemes 2-4 frd.; leaflets 5; pod 8-12 seeded. .. *I. pentaphylla*.  
 Racemes 6-12 frd.; leaflets 3; pod 6-8 seeded with bordered sutures. .. *I. trifoliata*.  
 Racemes 6-12 frd., leaflets 3; pod tetragonous, 6-10 seeded. .. 8. *I. trita*.
2. Pod subfalcate, slightly compressed, 2-4 seeded :—  
 Racemes 10-20 frd.; flowers small; bracts exceeding the calyx; leaflets 5-15. Undershrub. 9. *I. Anil*.  
*I. enneaphylla*.
- B. Flowers in 10-20 frd. heads :—  
 Leaflets 7-11. Pod cylindrical-2 seeded. Herbaceous. ..

## II. Leaves simple. Annuals :—

Flowers in 6-10 frd. racemes; pod 1 seeded.	.. ..	<i>I. linifolia.</i>
Flowers in 4-8 frd. heads; pod 2 seeded.	.. ..	<i>I. cordifolia.</i>

1. *Indigofera leptostachya* DC.

A shrub up to 10 ft. in height with slender twiggy branches and silky young shoots. *Leaves* 3-4 in. long, imparipinnate. *Leaflets* 13-19, opposite, .5-1 in. long, oblanceolate or oblong, green above, glaucous beneath, glabrescent; stipels minute. *Racemes* up to 3 in. in length, long-peduncled; bracts 0. *Calyx* about .1 in. long, brown silky; teeth deltoid. *Corolla* .25-.35 in. long, pale red, canescent outside. *Pod* 1-1.5 in. long, 8 seeded, straight, turgid, glabrous, with narrow sutures.

In grass-lands in the KHASI HILLS, above 5,000 ft.

2. *Indigofera galeoides* DC.

A tall shrub about 12 ft. high with twiggy branches, thinly covered with adpressed hairs. *Leaves* imparipinnate, 6-12 in. long, petioled. *Leaflets* 11-15, opposite, .4-2 in. in length, oblong or obovate-oblong, mucronate, membranous, green above, glaucous and with very short adpressed hairs beneath; stipels minute. *Racemes* 2-3 in. long, dense-flowered; bracts minute. *Calyx* very small, canescent; teeth deltoid. *Corolla* pale-red, .3-.5 in. long, canescent outside. *Pod* 2.5-3 in. long, 15-20 seeded, straight, cylindrical, beaked, glabrous.

KHASI HILLS, 5000 ft., generally in shady localities.

Flrs. 6-7.

*Indigofera Gerardiana* Wall. Var. *heterantha* F. B. I.*I. heterantha* Wall.

A deciduous shrub usually up to 5 ft., but sometimes larger with white canescent branchlets. *Leaves* 1-4 in. long, short petioled; stipules setaceous. *Leaflets* 9-31, .2-.65 in., obovate or oblong-obovate, obtuse or retuse, mucronate, clothed on both sides with adpressed white hairs, pale grey beneath; stipellæ minute. *Racemes* 1-3 in. long, densely adpressed hairy; pedicels very short; bracts minute, shorter than the calyx. *Flowers* .3-.5 in., pale red or purple. *Calyx* hairy, standard and keel pubescent outside, specially towards the top. *Pod* 1-1.5 in. long, cylindrical, glabrous.

May be found in KHASI and JAINTIA HILLS between 4000 and 5000 ft.

Flrs. 5-6. Fr. 9-10.

### 3. *Indigofera atropurpurea* Ham.

A large shrub with twiggy branches, nearly glabrous. *Leaves* imparipinnate, up to 9 in. in length; petiole .5-2 in. long. *Leaflets* opposite, 11-17, .5-1.5 in. long, oblong or obovate or obovate-oblong, obtuse, mucronate, membranous, green above, thinly hairy or glabrescent and paler beneath, shortly stalked. *Racemes* 4-6 in. in flowers, lengthening to 9 in. in fruit, dense towards the apex; bracts about .12 in. long, subsistent, lanceolate, acuminate, exceeding the subtended buds; pedicels short. *Flowers* .3-.4 in. long. *Calyx* about .1 in. long, obliquely campanulate with scattered white hairs outside. *Corolla* .25-.3 in. long, deep pink or dark-purplish. *Pod* 1-1.5 in. long, 6-10 seeded, slightly compressed, turgid, not narrowed into a beak.

KHASI and GARO HILLS, up to 4000 ft.

Flrs. 5-7. Fr. cold weather.

### 4. *Indigofera pulchella* Roxb. Vern. *Sam-nabat*, Garo.

A shrub 10-12 ft. high; stem sulcate, dark-grey, often attaining 1 in. in diam. at the base. *Leaves* imparipinnate, 3-6 in. long, shortly petioled. *Leaflets* 13-21, opposite, .6-1.5 by .3-.5 in., obovate-oblong, subcoriaceous, pale-green above, glaucous beneath with adpressed hairs on both surfaces; stipels minute or 0. *Racemes* 1-4 in. long, short peduncled, moderately compact; bracts boat-shaped and with a cusp, longer than the subtended buds; pedicels short. *Calyx* about .1 in. long, oblique, canescent; teeth short. *Corolla* .5-.8 in. long, bright red or rose-coloured; standard nearly .3 in. broad, reflexed. *Pod* 1.2-1.7 in. long, 12-seeded, straight, turgid, glabrous; sutures broad.

KHASI HILLS up to 5,000 ft. Also Rongrengiri in the GARO HILLS, 2,000 ft.

Flrs. 3-4. Fr. 8-10.

### 5. *Indigofera Dosua* Ham. Vern. *Dieng-sha-ratoh*, Synt.

A densely grey pubescent low woody shrub. *Leaves* subsessile, 1-4 in. long; stipules setaceous. *Leaflets* 21-31, usually opposite, .25-.5 in. long, linear-oblong to elliptic-oblong, mucronate, membranous, dull-green above, glaucous beneath, densely grey or brown pubescent; stipels 0. *Racemes* 1.5-3 in. long, peduncled, densely many flowered; bracts .2-.25 in. long, narrow, lanceolate, cuspidate, silky, exceeding the buds; pedicels very short. *Calyx* about .1 in. long, densely hairy; teeth subulate. *Corolla* pink purple, .3-.5 in. long, glabrous. *Pod* 1-1.7 in. long, 8-12 seeded, straight, terete, glabrescent; sutures very broad, shortly beaked.

KHASI GARO and MIKIR HILLS up to 6000 ft., fairly common in grass-lands.

Var. *tomentosa* also occurs in the same localities, which has longer leaves, longer and more numerous leaflets, larger racemes and more velvety bracts with a longer cusp.

Flrs. 6-7. Fr. 8-9.

**6. *Indigofera nigrescens* Kurz. Vern. Dieng-soh-brah, Khasi.**

A shrub 5-6 ft. high with dark-brown branches. *Leaves* 1-6 in. long; rachis slender. *Leaflets* 9-15, opposite, .6-1 by .25-.4 in., obovate or elliptic, shortly petioluled, mucronate and often emarginate at the tip, membranous, dark-green and nearly glabrous above, bluish-glaucous and with scattered bristles beneath. *Racemes* 4-5 in. long, peduncled; rachis stout, pubescent. *Flowers* numerous, uniformly dense, about .25 in. long, drooping, very shortly pedicelled bracts linear lanceolate, long pointed with setaceous margins about .1 in. long. *Calyx* about .12 in. long, pubescent with fugaceous black or dark brown hairs outside; teeth minute, deltoid. *Pod* .8-1 in. long, drooping, straight, terete, thin-walled, 6-8 seeded, at first covered with black or dark-brown hairs, but soon glabrescent; sutures not thickened; seeds sub-globose, smooth.

KHASI HILLS 4-5000 ft. e.g., Riat khwang, Nongstoin etc., chiefly in grass-lands.

Flrs. 9-10. Fr. 10-11.

### 7. *Indigofera viscosa* Lamk.

A much-branched cæspitose undershrub up to 3 ft. in height, densely viscous throughout. *Leaves* pinnately 7-9-foliolate, up to 1·5 in. in length; leaflets opposite, membranous, glaucous and with persistent adpressed bristly hairs beneath; stipules minute. *Racemes* 6-12-flowered, about 1 in. long; flowers red. *Pod* ·75-1 in. long, 10-12 seeded, straight, faintly torulose.

Plains of both valleys.

### *Indigofera pentaphylla* Linn.

A densely cæspitose annual with a few slender but stiff branches. *Leaves* pinnately 5-foliolate, up to about 1 in. in length; leaflets 5, opposite, obovate, membranous, glaucous beneath; stipules setaceous, persistent. *Flowers* red in short 2-4-flowered racemes. *Pod* ·5-·75 in. long, 8-12 seeded, straight and cylindrical, turgid.

Grass-lands in the plains.

### *Indigofera trifoliata* Linn.

A much-branched perennial, usually trailing, up to 2 ft. in height. *Leaves* pinnately and subdigitately 3-foliolate; stipules minute; leaflets ·5-1 in. long, oblanceolate, ashy green above, glaucous and with black dots beneath. *Racemes* 6-12 flowered, sessile, congested. *Calyx* very small. *Corolla* about ·15 in. long, red, much exerted. *Pod* ·5-·6 in. long, 6-8 seeded, straight, deflexed, with acutely keeled sutures.

In grass-lands in the plains.

### 8. *Indigofera trita* Linn. fl.

An undershrub 2-3 ft. high, with slender stiff branches. *Leaves* pinnately 3-foliolate; leaflets obovate, membranous, thinly clothed with adpressed grey hairs, the terminal one stalked and up to 1·5 in. in length; stipules ·1 in. long, setaceous. *Racemes* 1-2 in. long, 6-12 flowered, much congested, often forming a terminal panicle above the uppermost leaves. *Calyx* ·12-·25 in. long, white, canescent; teeth setaceous. *Corolla* purplish, ·15-·5 in. long. *Pod* ·75-1·2 in. long, 6-10 seeded, tetragonous, obtusely keeled, glabrescent.

In grass-lands in the plains, also up to 5,500 ft. in the KHASI HILLS, e.g., Byntar.

Flrs. 9-10.



### 9. *Indigofera Anil* Linn.

A low undershrub up to about 4 ft. in height; stem canescent, sulcate. *Leaves* 2-3 in. long, petioled. *Leaflets* 5-15, opposite, .4-.8 in. long, obovate-oblong, shortly cuspidate, sub-coriaceous, glabrous above, adpressedly grey hairy beneath, very shortly petioluled. *Racemes* 1-1.5 in. long, peduncled, 10-20 flowered; bracts subulate, about .1 in. long. *Calyx* about .04 in. long; teeth deltoid. *Corolla* pale-orange, about .12 in. long, silky. *Pod* .3-.6 in. long, 2-4 seeded, subfalcate, slightly compressed, recurved, turgid, at first adpressed pubescent, ultimately glabrescent, upper suture broadly keeled, shortly beaked.

Near Ahotguri, Majuli Island, SIBSAGAR DISTRICT, possibly in similar other localities in the plains.

Flrs. 10-11. Fr. 11-12.

### *Indigofera enneaphylla* Linn.

A densely caespitose much branched trailing annual or biennial up to 18 in. in length. *Leaves* imparipinnate, 11.5 in. long; leaflets 7-11, alternate, oblanceolate, subcoriaceous, terminal, sessile; stipules minute. *Flowers* in dense heads of 12-20. *Calyx* .1-.15 in. long with long setaceous teeth, slightly shorter than the corolla. *Pod* .1-.15 in. long, 2-seeded, cylindrical, thinly hoary.

Believed to occur in the plains of both valleys.

### *Indigofera linifolia* Retz. Vern. *Bhangra*, Beng.

A much branched caespitose annual or perennial, silvery-hoary throughout, up to a foot in height. *Leaves* simple, .5-1 in. long, linear to obovate, mucronate; petiole very short; stipules minute. *Flowers* white or bright-red, in 6-12 flowered dense racemes. *Calyx* small. *Corolla* .15-.25 in., standard spurred, long. *Pod* 1-seeded, minute, globose, mucronate.

Apparently very common in grass-lands in the plains of both valleys.

### *Indigofera cordifolia* Heyne.

A diffuse herbaceous annual of dwarfish habit. *Leaves* simple, .5-.75 in. long, ovate-cordate, mucronate, thinly pubescent above, more densely beneath; stipules minute. *Flowers* bright-red but hidden inside the long-toothed downy calyx, in 4-8 flowered sessile heads. *Pod* .25 in. long, pubescent, usually 2-seeded.

Inconspicuous but common in grass-lands in the plains.

*Cicer arietinum* Linn. Vern. *But-mah*, Ass.; *Chhola*, *But-kalai*, Beng.; Gram or horse gram, Eng.

A viscous annual herb. *Leaves* usually imparipinnate; stipules

large. *Leaflets* many, rigid, deeply toothed, strongly veined; stipels 0. *Flowers* bluish-purple, axillary, solitary. *Calyx-tube* oblique; teeth unequal. *Corolla* exserted; standard broad. *Stamens* diadelphous (9+1). *Staminal* tube with an oblique mouth. *Style* beardless, persistent. *Pod* sessile, turgid, 2-seeded. *Seeds* beaked and with a slender funicle; cotyledons yellow.

Much cultivated in Upper India and to a certain extent in GOALPARA, KAMRUP and DARRANG.

*Lens esculenta* Mœnch. Vern. *Masur*, Hind & Beng.

A small erect softly pubescent herb. *Leaflets* 4-6 pairs; small, sessile, lanceolate, entire, rachis ending in a bristle; stipules semi-sagittate; stipels 0. *Racemes* 2-4 fld. *Flowers* pale blue or purple. *Calyx* teeth sub-equal, linear, silky. *Corolla* a little exserted; style bearded. *Pod* compressed, about .5 in. long, rhomboid-oblong. *Seeds* compressed of the shape of double convex lens, grey with minute spots, not beaked; cotyledons red.

This useful pulse is very successfully cultivated as a cold weather crop in GOALPARA, KAMRUP and DARRANG by immigrants from NORTHERN and EASTERN BENGAL.

*Lathyrus sativus* Linn. Vern. *Khesari*, *Teora*, Beng. & Ass.

An annual subscandent herb with hollow winged stems. *Leaves* paripinnate, the rachis ending in a tendril or bristle; petiole winged; stipules lanceolate, entire, auricled. *Leaflets* 2 or 4, 1.2-5 by .1-1.5 in., lanceolate. *Calyx* campanulate; teeth long, lanceolate. *Corolla* .5-.7 in. long, bright blue or white; standard broad, finely veined; keel short. *Staminal tube* truncate. *Style* flattened at the tip, bearded. *Pod* 4-5 seeded, glabrous, compressed; dorsal suture with a narrow spreading wing on either side. *Seeds* faceted, spotted.

A useful pulse cultivated as a *rabi* crop in the BRAHMAPUTRA VALLEY up to DARRANG.

### 5. MILLETTIA Wt. & Arn.

Trees or shrubs, the latter usually climbing. *Leaves* imparipinnate; leaflets opposite. *Racemes* simple and axillary, often fascicled or paniced and terminal. *Calyx* campanulate, shortly toothed or truncate. *Petals* much exserted, long-clawed. *Stamens* diadelphous, but the vexillary filament is sometimes connate from the middle; anthers uniform, basifixed. *Ovary* sessile, linear, few-ovuled; style filiform, incurved, glabrous; stigma capitate. *Pod* linear or oblong, flat or turgid, few-seeded, tardily dehiscent.

#### I. Trees or erect shrubs; standard not auricled.

Pod usually compressed :—

Leaflets 15-21, pubescent beneath;  
stamens monadelphous. Pod pubescent, not broad, sutures not thickened.      ..      ..      ..

1. *M. pulchra*.

- Leaflets 9-11, glabrescent beneath; stamens diadelphous. Pod with prominent warts, sutures thickened and winged. . . . . 2. *M. Prainii*.
- Leaflets 5-7, glabrescent beneath; stamens diadelphous. Pod smooth, broad, sutures not thickened. . . . . 3. *M. Piscidia*.
- II. Climbers; standard not auricled; pod not compressed, usually constricted between seeds when more than one seeded :—
- Leaflets 11-17, brown pubescent beneath; stipules 0; standard glabrous on the back. . . . . 4. *M. pachycarpa*.
- Leaflets 5-7, glabrescent beneath, stipellate; standard densely silky. . . . . 5. *M. cinerea*.
- III. Climbers; standard auricled. Pod compressed :—
- Leaflets 7-9, long caudate; stipules and stipels falling off early; pod less than 1 in. broad, thin, minutely pubescent, sutures not prominently thickened, valves not woody. . . . . 6. *M. caudata*.
- Leaflets 7-9, shortly acuminate; bases of stipules persisting and prominent on the branches; stipels persistent. Pod 1-1.5 in. broad, velvety tomentose, thickened at the sutures, valves woody. . . . . 7. *M. auriculata*.

**1. *Millettia pulchra*** Benth. Vern. *Dieng-shakuriao*, *Dieng-tiw-khmat*, *Taw-tynneng*, *Sa-long-teu*, Khasi.

An erect shrub or a small tree 25-30 ft. high; young parts densely rusty pubescent; branchlets glabrous, more or less sulcate, lenticelled; bark thin, dark-grey outside, dull-white inside. *Leaves* 5-9 in. long; rachis sulcate, finely adpressed pubescent; stipules ligulate, .1-1.5 in. long, densely pubescent. *Leaflets* 15-21, .9-3 by .3-.8 in., narrow-elliptic or oblong, tapering acuminate, margins slightly recurved, thinly chartaceous, dark-green and glabrous above, adpressedly silky pubescent and bluish-grey beneath; lateral nerves about 7 on either half, much arched, very slender; petiolules .1-1.5 in. long; stipels bristle-like, scarcely .1 in. long. *Racemes* axillary, simple, 5-8 in. long; bracts minute; flowers purple or nearly so, fascicled on slender pedicels, .1-1.6 in. long. *Calyx* as long as pedicel, shortly toothed or almost truncate, adpressed pubescent outside.

*Corolla* about .5 in. long; standard pubescent outside along the nerves when young or glabrous, generally with a green centre, not spurred. *Ovary* silky pubescent. *Pod* 2-4 by .5-.6 in., minutely adpressed hairy, generally 2-3 seeded. *Seeds* suborbicular, .25 in. across, reddish-brown.

KHASI HILLS, 3-4,500 ft., e.g., Cherrapunji, Tyrna, Puriem, Gunner falls etc.

The wood is very tough and is fit for tool handles and agricultural implements.

Flrs. 4-6, sometimes in December.\* Fr. 9-10.

The form with larger leaflets may be a separate variety but they are connected by intermediate characters with the forms with small leaflets.

## 2. *Millettia Prainii* Dun. Journ. Linn. Soc. Vol. XLI., 1912.

A small or middle-sized tree up to 40 ft. in height and 4-5 ft. in girth with a short trunk and spreading crown, having a tendency to be gregarious; bark dark-greenish grey and lenticelled outside both in horizontal and vertical short bar; blaze cream coloured inside, green underneath the corky layer; young parts pubescent. *Leaves* 6-10 in. long; rachis terete, glabrous; stipules minute. *Leaflets* up to 11, 2-4 by .7-1.5 in., elliptic-lanceolate or oblanceolate, tapering acuminate, oblique at the base, chartaceous, minutely adpressed silky when young, glabrescent with age, pale or subglaucous beneath; lateral nerves 7 or 8 on either side of the midrib, slender, arched; petiolules .2-.25 in. long, terete, glabrous. *Racemes* simple, axillary, 4-6 in. long; flowers generally in fascicles of two, about .5 in. long. *Calyx* about .1 in. long, deeply cup-shaped, somewhat oblique, dark-brown and slightly pubescent outside, glabrous inside; teeth minute, deltoid. *Petals* purplish-white; standard orbicular with numerous fine purple lines at the base; wings and keel of a somewhat deeper purple. *Stamens* diadelphous; filaments glabrous, shining. *Ovary* covered with dark-brown bristles; style glabrous. *Pod* 3-4 by .6-.8 in., 2-3 seeded, with prominent scattered warts; both sutures

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\* This may be a variety different from the type described above, but the materials at hand are insufficient to enable me to separate them.

thickened and winged. *Seeds* about .5 by .3 in., compressed, smooth, reddish or chocolate.

Found along the right bank of the Monas (Dist. GOALPARA), also along the Tura-Dalu Road in the GARO HILLS.

Wood yellowish, hard, in alternate bands of light and dark tissue, not liable to split or warp, weighing about 55 lbs. per c. ft.

Flrs. 3-4. Fr. 6-9.

**3. *Millettia Piscidia* Wight. Vern. *Dieng-soh-lynthein*, Khasi; *Mohal*, Sylh.**

A small or middle-sized tree in general appearance much resembling the litchi. *Bark* plain, greenish-grey to dun-brown; blaze pale granular. *Leaves* somewhat approximate at the ends of the branchlets; stipules minute, caducous. *Leaflets* 5-7, but sometimes only three; lateral generally opposite, extipellate, 2-4 by .7-1.2 in., ovate-oblong, bluntly caudate, thinly coriaceous, quite glabrous, green on both surfaces or subglaucous beneath; main lateral nerves 6-8 on either half, arched, very slender; petiolules about .15 in. long. *Racemes* simple, lax-flowered: pedicels .25-.35 in. long, capillary, ebracteate. *Calyx* membranous, thinly silky or almost glabrous. *Corolla* white, .5-.6 in. long: standard glabrous. *Stamens* diadelphous. *Pods* 3-7 by .8-1.3 in., narrowed at both ends, coriaceous, smooth but faintly reticulate at the faces, early-dehiscent, 2-4 seeded. *Seeds* laterally oblong, .7 by .5 in., with a horny smooth brown testa.

Along the southern foot of the KHASI HILLS, e.g., Tyrna, Shella, banks of the Loobah Lake, etc., generally in shady ravines.

Flrs. Rainy season. Fr. Cold weather.

**4. *Millettia pachycarpa* Benth. Vern. *Bokoa-bih*, *Bokol-bih*, Ass.; *Holosi*, Ass.; (Darr.); *Mak-khal*, Garo; *Ru-go-jao*, Kach.; *Arru*, Kuki, *Khariu*, Khasi.**

A large climber; branches terete; shoots, rachis, petiolule and inflorescence brown velvety. *Leaves* 9-15 in. long, deciduous; stipules deltoid, early deciduous. *Leaflets* exstipellate, 11-13, 2-3-8 by 1-3 in., terminal obovate, lateral oblong-lanceolate to oblanceolate, chartaceous, abruptly acuminate, glabrous above, brown tomentose beneath; lateral

nerves 10-14 on either half, very oblique, nearly straight; base cuneate; petiolules  $\cdot 15\text{--}\cdot 25$  in. long. *Racemes* 5-9 in. long, somewhat densely flowered, axillary or forming terminal panicles. *Flowers* about 1 in. long, in fascicles at the nodes, sometimes from a short peduncle; pedicels stout,  $\cdot 2\text{--}\cdot 25$  in. long; bracts and bracteoles small. *Calyx*  $\cdot 2\text{--}\cdot 25$  in. long, bowl-shaped, brown-tomentose; teeth minute. *Corolla*  $\cdot 7\text{--}\cdot 9$  in. long, light-mauve; standard glabrous on the back, not auricled. *Stamens* monadelphous. *Pod* 4-5 in. long, 1 in. or more broad, 1-3 seeded, woody, rugose, glabrous, often indented between the seeds.

GARO and KHASI HILLS and their neighbourhood up to 4,000 ft. The roots are used to poison fish.

Flrs. 3-4.

**5. *Millettia cinerea* Benth.** Vern *Mei-Blei*, *Jarmeisoh-lynkai*, *Mei-khari-jendru*, Khasi; *Jermi-sna-jalong*, Synt.

A fairly large woody climber with a bushy habit; young branches pubescent; bark exuding a reddish gum. *Leaves* deciduous about a foot long; common petiole channelled, swollen at the base; stipules subulate up to  $\cdot 2$  in. long. *Leaflets* generally 5, 2-5 by 1-2 in., obovate-oblong or elliptic, abruptly bluntly acuminate, membranous or chartaceous, pubescent beneath when young, soon glabrescent; lateral nerves 7-9 on either half, oblique, more or less arched; petiolules about  $\cdot 15$  in. long, stout; stipels setaceous, as long as the petiolules. *Racemes* generally in terminal, silky, pubescent panicles, 4-9 in. long; flowers about  $\cdot 7$  in. long; pedicels up to  $\cdot 25$  in. long; bracts and bracteoles subulate, caducous. *Calyx* about  $\cdot 15$  in. long, densely silky; teeth short. *Corolla* reddish,  $\cdot 5\text{--}\cdot 6$  in. long, grey-silky; standard densely silky on the back, not auricled. *Stamens* diadelphous. *Ovary* densely shaggy with white hairs; style glabrous, curled upward. *Pod* conspicuously torulose, generally 1-3 seeded, but sometimes as many as 8-seeded; joints globose, about 1 in. across, velvety, specially when young.

Throughout the plains of ASSAM and up to 5000 ft. in the GARO and KHASI HILLS.

Flrs. 5. Fr. 9-12.

**6. *Millettia caudata* Baker.**

An erect or straggling shrub about 15 ft. high; branches thin, glabrous, sparsely lenticelled. *Leaves* 12-15 in. long; common petiole slender, glabrous. *Leaflets* 5-9, 4-9 by 1.5-2.7 in., oblong-elliptic to oblong-lanceolate or oblanceolate, long-acuminate, thinly chartaceous, glabrous and bright green above, glaucous beneath; lateral nerves about a dozen on either half, slender, arched; petiolules .2-.35 in. long; stipels minute, caducous. *Racemes* axillary, 4-6 in. long, rather lax-flowered; pedicels short. *Calyx* about .12 in. long, silky; margin wavy or indistinctly toothed. *Corolla* .3-.4 in. long, densely silky; standard auricled. *Stamens* 2-adelphous. *Pod* 3-5 by .6-.75 in., straight, rigidly coriaceous or semi-woody, minutely adpressed pubescent, dehiscent, obliquely jointed, 3-5 seeded.

KHASI HILLS up to 3,000 ft.; also plains of SYLHET and UPPR ASSAM (down to Tezpur).

Fls. 5-7. Fr. 12-3.

**7. *Millettia auriculata* Baker.** Vern. *Hololokha*, *Bologlokha*, Mech; *Gurari*. Gauj. Hind.

A woody climber distinctly gregarious in habit; young shoots fleshy, finely silky-tomentose. *Leaves* 1-2 ft. long, crowded at the ends of branchlets; common petiole terete, swollen at the base; stipules large, silky outside, basal portion usually persistent and prominent on the branches. *Leaflets* 7-9, 3-8 by 2-4 in., obovate-oblong or elliptic, bluntly and often abruptly acuminate, chartaceous, densely grey silky when young, afterwards glabrescent and green above, pale and minutely pubescent beneath; lateral nerves 10-14 on either half, oblique, nearly straight; base cuneate or rounded; lateral petiolules .2 in. long; stipels minute, setaceous. *Racemes* axillary, always simple, 4-9 in. long. *Flowers* dull-white, shortly pedicelled, fascicled on the rachis. *Calyx* .1-.12 in. long, broadly campanulate, shortly toothed, densely brown silky. *Corolla* about .3 in. long, silky all over; standard auricled. *Stamens* monadelphous; the tube being slightly split in front. *Style* filiform, glabrous, incurved; ovary hairy. *Pod* 4-7 by 1.1-1.5 in., straight,

strap-shaped and hard, permanently brown velvety, with very thick sutures, tardily dehiscent, 2-4 seeded.

In nearly all sal areas in the PROVINCE, chiefly in grassy blanks. Very common in the drier parts of the GOALPARA Sal forests.

The leaves are used as fodder and the root to kill fish.

Flrs. 4-6. Fr. 11-2.

*Millettia fruticosa* Benth. Closely resembles the last species, differing by having more numerous (9-11) leaflets, subsessile reddish flowers in shorter axillary racemes and also in terminal panicles and nearly glabrous mature pods.

Said to occur in Assam, but no specimens are available.

*Wisteria chinensis* Sieb & Zucc.

A large climbing shrub; bark darkish brown. *Leaves* alternate, paripinnate, 5-6 in. long. *Leaflets* ovate, acuminate, entire; nerves hairy. *Flowers* bluish, about .9 in. long, in 5-7 in. long villous terminal racemes from the ends of branchlets; pedicels about .9 in. long, hairy. *Calyx* distinctly lobed; lobes often acute. *Pods* thin, coriaceous, dehiscent (Brandis).

KHASI & JAINTHIA HILLS (No. 9906) Shillong 5000 ft.

Flrs. 3.

## 6. TEPHROSIA Pers.

Herbs or undershrubs. *Leaves* imparipinnate; stipules setaceous, usually persistent. *Leaflets* few or many, opposite, usually obliquely parallel nerved; stipels 0 or minute. *Racemes* leaf-opposed or terminal or flowers axillary, solitary or in pairs. *Calyx* campanulate; teeth distinct. *Petals* clawed; standard suborbicular; wings slightly adnate to the incurved (but not beaked) keel. *Stamens* diadelphous; anthers obtuse. *Ovary* sessile, many-ovuled; style incurved, filiform or flattened, glabrous or villous; stigma often penicillate. *Pod* flattened, continuous or more or less septate between the seeds. *Seeds* ovate; strophiole 0 or small.

Shrub 6-10 ft. high. Branches angled or grooved. Leaflets 1.5-2.5 in. long, ligulate, acute. Flowers large, white.

1. *T. candida*.

Perennial herb, 1-2 ft. high. Branches terete. Leaflets hardly 1 in. long, obovate, obtuse.

Flowers small, purplish.

2. *T. purpurea*.

\* It is sometimes reduced to a semierect shrub in the dense shade of the forest.



1. **Tephrosia candida** DC. Vern. *Bilakshani* or *Bilokhoni*, Ass.; *Bangali-dadigdiga*, Ass. (Kam.); *Mith-phang*, Cach.; *Samendu*, *Bolmendu*, Garo; *Dieng-toh*, Khasi; *Nathri*, Jharua; *Balasor*, Mech.; *Bangara*, Beng. (Sylh.).

A shrub 6-10 ft. high with a gregarious tendency; branches angled or grooved, densely grey-silky. *Leaves* 5-10 in. long; rachis grey-silky. *Leaflets* 15-29, 1.5-2.5 by .3-.5 in., narrowly oblong to obovate-oblong or ligulate, quite entire, minutely mucronate, subcoriaceous, dark-green and subglabrous above, pale and densely adpressed silky beneath; lateral nerves numerous, slender, oblique, straight, almost concealed by the dense silky hairs beneath; base acute; stipules .2-.25 in. long, deltoid-acuminate, hairy. *Racemes* simple, 6-9 in. long, terminal with often a few shorter ones from the axils of the upper leaves; rachis stout, angled or sulcate. *Flowers* creamy-white in fascicles of 2-4; pedicels .3-.8 in. long, filiform, silky, slightly thickening in fruit. *Calyx* .15-.2 in. long, broadly campanulate, somewhat oblique; teeth short, unequal, silky. *Corolla* .7-1 in. long; standard obovate, densely silky outside. *Style* flattened, silky. *Pod* 3-4 by .3 in., 10-12 seeded, continuous, densely covered with adpressed brown silky hairs, usually tipped with persistent style. *Seeds* brownish, transversely oblong, compressed, .15 by .12 in., with a white strophiole.

Throughout the province, generally in low lying grass-lands ascending to 3,000 ft. in the MIKIR, GARO and KHASI HILLS.

Often grown in tea-gardens as a fertiliser in newly planted plots, and also as a nurse for seedlings in forest plantations and in gardens for ornament.

Flrs. 8-10. Fr. 11-12.

2. **Tephrosia purpurea** Pers. Vern.; *Ban-nil*, Beng.; *Saraphunka*, Sans.

A suberect diffuse perennial; branchlets terete, glabrescent, often more or less zigzag; young parts silky. *Leaves* 2-6 in. long; stipules filiform, subulate, generally ascending. *Leaflets* 7-21, .3-1 by .1-.6 in., obovate, rounded or emarginate, shortly mucronate, cuneate at the base, glabrescent above, adpressedly hairy beneath; lateral nerves very oblique, slender, straight, purplish. *Racemes* 3-6 in. long, lax-flowered, often leaf-opposed; bracts 3-furcate, setaceous.

*Calyx* .1-.15 in. long, strigose outside, with sharp-pointed teeth. *Corolla* .25-.3 in. long, purple; standard .15 in. broad. *Style* flattened, subglabrous. *Pod* 1.1-1.5 by .15 in., straight, thinly pubescent, 4-6 (10?) seeded. *Seeds* greenish-grey, smooth, speckled.

Fairly common in dry grass-lands and road-sides.

Flrs. Rainy season. Fr. 12-1.

***Robinia pseud-acacia* Linn.**

A tree; young parts pubescent. *Leaves* imparipinnate; leaflets usually 6 pairs, elliptic, membranous, obtuse. *Flowers* in axillary racemes.

N. American species. Cultivated in Lake Garden Shillong, 4,500 ft.

Flrs. 4.

**7. SESBANIA Pers.**

***Sesbania ægyptiaca* Pers. Vern.; Jayanti, Sans.; Beng., and Ass.**

A quick-growing soft-wooded short-lived shrub, 10-15 ft. high with short terete branches. *Leaves* paripinnate, 3-6 in. long; stipules lanceolate, deciduous. *Leaflets* 8-20 pairs, .6-1 by .1-.2 in., linear-oblong, membranous, glabrous, pale-green, minutely petioluled. *Racemes* axillary, 3-6 in. long, 6-10 flowered; pedicels .15-.2 in. long. *Calyx* .2 in. long, campanulate, membranous, glabrous, short-toothed. *Petals* subequal, long-clawed, pale-yellow or standard often with purple spots, maroon or deep purple. *Stamens* 2-adelphous. *Ovary* stalked, many-ovuled; style filiform, incurved, glabrous. *Pod* 6-9 in. long by .15 in. across, torulose, flexible, twisted, 20-30 seeded, dehiscent, septate between the seeds.

Cultivated as a fertilizer and for shelter in young plantations, sometimes found wild as escapes.

The leaves are used as poultices over rheumatic and other swellings. An ointment prepared from the seeds is used for itches and other skin diseases. The fibre of the bark is used for ropes and the leaves and tender branches for cattle-fodder.

Flrs. 8-9. Fr. Cold season.

**8. LESPEDEZA Mich.**

Herbs or undershrubs. *Leaves* pinnately 3-foliolate, stipulate; leaflets without stipels. *Flowers* axillary, fascicled

or racemed. *Calyx-tube* campanulate; teeth long. *Corolla* exserted; standard broad. *Stamens* diadelphous (9+1). *Ovary* sessile or stipitate, 1-ovuled; style long, incurved, often persistent; stigma minute. *Pod* small, oblong, compressed, indehiscent, 1-seeded, reticulately veined.

Leaflets thin grey pubescent beneath :—

Keel obtuse, not much incurved. Petiole

1.1-5 in. long. Leaflets up to 2 in. in length. Pod .25 in. long, downy. ..

1. *L. elliptica*.

Keel acute, much incurved. Leaflets generally below 1 in. in length :—

Petiole not exceeding .7 in. in length.

Pod about .5 in. long with dense spreading hairs. ..

2. *L. stenocarpa*.

Petiole up to .25 in. long, densely pubescent. ..

3. *L. eriocarpa*.

Leaflets silvery, canescent beneath, up to 2 in. in length. Keel acute and incurved. Pod scarcely .25 in. long, glabrescent ..

4. *L. Thomsoni*.

### 1. *Lespedeza elliptica* Benth.

A shrub 6-10 ft. high; branches obscurely sulcate, finely grey-pubescent. *Leaves* 2-4 in. long; petiole 1-1.7 in. long, slender, pubescent. *Leaflets* .7-2.2 by .4-1.2 in., obovate-cuneate, obtuse, subcoriaceous, green and minutely canescent above when young, afterwards glabrescent, grey and more or less densely adpressed pubescent beneath; midrib shaggy beneath; petiolules .1-.2 in. long. *Racemes* 1.5-4 in. long, peduncled; rachis and the short pedicels hairy; bracts and bracteoles ovate-lanceolate, .05-.1 in. long, hairy. *Calyx* .2-.25 in. long, grey-canescant; teeth linear, twice as long as the tube. *Corolla* deep red. .3-.4 in. long. *Pod* about .25 in. long, oblong, stalked, downy.

KHASI HILLS. Fairly common in the neighbourhood of Myrong such as Nongbri, Bynlar, etc.

Flrs. 9-10. Fr. 12-1.

### 2. *Lespedeza stenocarpa* Maxim. Syn. *L. macrostyla* Baker (in part).

An undershrub 3-5 ft. high with densely grey-pubescent branches. *Leaves* .7-1.5 in. long; petiole .5-.7 in. long. *Leaflets* .5-.8 by .4-.6 in., obovate-cuneate, often emarginate,

rigidly subcoriaceous, glabrescent and rather strongly veined above, generally persistently white-silky beneath. *Racemes* short, dense-flowered, silky; buds hidden by silky bracts; pedicels  $\cdot 1\text{--}\cdot 2$  in. long. *Calyx* about  $\cdot 1$  in. long; teeth longer than the tube. *Corolla*  $\cdot 4\text{--}\cdot 6$  in. long, deep rose; keel acute, much incurved. *Pod* about 1 in. long, shortly stalked, narrow-oblong, gradually tapering to the base of the persistent hairy style.

Up to 3000 ft. in the KHASI HILLS and possibly the MIKIR and other hills.

Flrs. 8-9. Fr. 12-2.

### 3. *Lespedeza eriocarpa* DC.

A much-branched undershrub 3-5 ft. high; branches slender, angular, furrowed, silky. *Leaves*  $\cdot 5\text{--}2\cdot 5$  in. long, gradually smaller towards the extremities of the branches; petiole  $\cdot 1\text{--}1$  in. long, channelled, adpressed silky; stipules  $\cdot 1\text{--}3$  in. long. *Leaflets*  $\cdot 2\text{--}1\cdot 2$  by  $\cdot 07\text{--}\cdot 7$  in., obovate-cuneate, mucronate, subcoriaceous, glabrous and strongly veined above, grey canescent beneath; petiolules short, densely adpressed pubescent. *Racemes* 2-3 in. long, peduncled, rather lax; pedicels  $\cdot 15\text{--}3$  in. long, very slender, pubescent; bracts setaceous. *Calyx*  $\cdot 2$  in. long, densely hairy; teeth linear, about twice as long as the tube. *Corolla* rosy-red,  $\cdot 4\text{--}5$  in. long; keel incurved. *Pod* about  $\cdot 25$  in. long, densely pubescent, shortly stalked; style pubescent at the base.

Grass-lands in the KHASI HILLS, 5-6000 ft.

Flrs. 9-11. Fr. 12-2.

### 4. *Lespedeza Thomsoni* Benth. Vern. *Ja Langkrem*, *Dieng-lalih*, Khasi.

A shrub up to 10 ft. in height; branches sulcate, silky. *Leaves*  $\cdot 5\text{--}4$  in. long, gradually smaller towards the ends of the branches; petiole 1-2 in. long, angled or somewhat flattened, white canescent; stipules  $\cdot 15\text{--}2$  in. long, subulate. *Leaflets*  $\cdot 4\text{--}2$  by  $\cdot 1\text{--}1$  in., oblong or elliptic, mucronate, subcoriaceous, dark-green, glabrous and elegantly veined above, densely silvery canescent beneath; petiolules short. *Racemes* 1-4 in. long, peduncled, congested, crowded at the extremities

of the branches to form false terminal panicles; pedicels .3-.5 in. long, slender, pubescent; bracts slightly longer than the pedicels, linear, terminating in a long bristle. *Calyx* .1-.15 in. long, obconic; teeth lanceolate, as long as the tube. *Corolla* deep purple, fading to bright rosy, .3-.35 in. long, subsessile, obovate or suborbicular, compressed, delicately veined, glabrescent; valves subcoriaceous; style beardless.

KHASI HILLS, 5-6000 ft., common round Shillong; also Sohiong, Nongbri, etc.

Fls. 8-9. Fr. 10-11.

## 9. SMITHIA Ait.

Herbs or undershrubs. *Leaves* usually paripinnate, the rachis then ending in a bristle; stipules scarious, persistent, generally appendaged. *Leaflets* small, sensitive, exstipellate. *Flowers* yellow, rarely bluish, generally in simple or compound racemes which are often unilateral; bracts and bracteoles scarious, persistent. *Calyx* deeply 2-lipped, the lower lip usually lobed. *Corolla* exserted; standard suborbicular with a cuneate base; wings clawed and auricled; keel-petals obtuse, incurved, clawed. *Stamens* diadelphous in two bundles of 5 each. *Ovary* many ovuled; style filiform. *Pod* of 1-seeded, orbicular, joints folded together inside the calyx. *Seeds* reniform, without a strophiole.

Racemes not paniced. *Calyx* rigid with simple parallel veins:—

*Leaflets* 2-10 pairs, bristly only along the midrib; pod 4-6 jointed. . . . .

1. *S. sensitiva*.

Racemes paniced. *Calyx* membranous with reticulate veins:—

*Leaflets* 10-12 pairs, without bristles; pod 20-25 jointed. . . . .

2. *S. grandis*.

### 1. *Smithia sensitiva* Ait.

A much branched semi-woody weedy plant about 2 ft. high; stem not bristly. *Leaves* .3-1 in. long; rachis bristly. *Leaflets* generally 4-12, rarely up to 20, .15-4 in. long, linear, ciliated with bristles, mainly along the midrib below. *Racemes* axillary, simple, peduncled; pedicels short, ascending. *Calyx* .25-.3 in. long; lips about equal, acute, entire, with a

few short deciduous scattered bristles; nerves parallel, close. *Corolla* bright-yellow with a brown band in the throat. *Pod* of 4-6 joints, densely papillose on the faces.

KHASI HILLS up to 3000 ft., generally in grass-lands.

Flrs. and Fr. 10-11.

### *S. ciliata* Royle.

An annual herb with much-branched slender stems up to 2 ft. in height. *Leaves* .5-1 in. long. *Leaflets* 6-16, .2-.3 in. long, linear, strongly bristly along the midrib below and bristly-ciliate along the margins. *Racemes* axillary, simple, short-peduncled, secund; bracteoles leafy, ciliate. *Calyx* .25 in. long, reticulate-venose, densely bristly-ciliate; upper lip truncate. *Corolla* yellow, (bluish-white, Haines), little exserted. *Pod* of 6-8 joints, obscurely papillose.

KHASI HILLS up to 6000 ft. in grass-lands.

Flrs. and Fr. 9-10.

## 2. *Smithia grandis* Benth. Vern.; *Alkhani*, Ass.; (Darr.).

Stems stout, 6-8 ft. high, finely sulcate, glabrous, without bristles. *Leaves* 3-4.5 in. long; rachis glabrous or with a few bristles near the base; stipules fixed by the middle, persistent; upper portion about 1 in. long, oblong-lanceolate, glabrous; lower .25-.3 in. long. *Leaflets* 20-24, .5-.6 by .1-.15 in., subsessile, linear-oblong, cuspidate, firmly subcoriaceous, glabrous; lateral nerves invisible. *Racemes* subsecund, forming terminal panicles, 5-8 in. long; pedicels .5-.6 in. long, rigid, ascending with few scattered subdeciduous bristles near the top; bracteoles 2 to each flower, .25-.35 in. long, persistent, glabrous. *Calyx* .4-.5 in. long, persistent and enlarged in fruit to .8 in., lips divided nearly down to the base, each lip undivided, broadly obovate, obscurely crenulate-serrate at the tips, strongly reticulate veined and with few bristles on the back near the apex. *Corolla* much exserted, 1.2 in. long, yellow with dark veins. *Pod* of 20-25 joints; joints suborbicular, about .15 in. across, conspicuously veined.

Sub-Himalayan Tracts from Dikrain in LAKHIMPUR westward to near Kachugaon in GOALPARA, in grass-lands or edges of swamps.

Flrs. 3-4. Fr. 1-2.

**S. blanda** Wall. Vern. *Bat-shakuria*o, Synt.

A perennial suffruticose herb 2-4 ft. high; stems clothed with fine yellow bristles. *Leaves* about 1 in. long; rachis bristly; stipules fixed by the middle, persistent, .5-.7 in. long, linear lanceolate with a long cusp at both ends, with scattered bristles outside. *Leaflets* 6-10, .4-.17 by .15-.2 in., subsessile, oblong, cuneate or rounded at the base, membranous but firm, with bristles along the edges and midrib. *Racemes* paniced, terminal; pedicels .1-.15 in. long, bristly; bracteoles about .12 in. long, bristly. *Calyx* about .25 in. long, densely bristly outside, the lower lip 3-lobed. *Corolla* bright yellow, about .5 in. long. *Pod* of 5-6 joints, each about .1 in. across, dark brown, reticulated.

KHASI and JAINTIA HILLS, 4-6000 ft., common in water-logged places and edges of swamps.

Flrs. and Fr. 9-11.

**10. ÆSCHYNOMENE** Linn.

Erect herbs or undershrubs. *Leaves* imparipinnate; stipules lanceolate or setaceous, deciduous, sometimes auricled. *Leaflets* very numerous, linear, sensitive, without stipels. *Flowers* yellow, generally in lax axillary racemes, each supported by a couple of bracteoles at the base of the calyx and a bract resembling the stipules at the base of the pedicel. *Calyx* deeply 2-lipped, the lips entire or faintly toothed. *Corolla* exserted, fugacious; standard orbicular; wings transversely barred; keel not beaked. *Stamens* in two bundles of 5 each. *Ovary* stalked, many ovuled. *Pod* long-stalked of 4-8 one-seeded separating joints. *Seeds* without a strophiole.

Stems slender. Flowers about .4 in. long.

Upper suture of pod straight or nearly so. . . 1. *Æ. indica*.

Stems stout. Flowers about .75 in. long.

Upper suture of pod indented like the lower. . . 2. *Æ. aspera*.

**1. Æschynomene indica** Linn. Vern.; *Kuhila*, Ass.; (Sibs.).

An erect slender much-branched annual, 1-3 ft. high; branchlets terete, finely striate and scabrid with minute warts. *Leaves* 1.5-3 in. long; stipules .2 in. long, membranous, auricled, ciliate-toothed. *Leaflets* 41-61, .08-.1 by .02 in., close, oblong, mucronate, 1-nerved. *Racemes* axillary, appearing terminal after the leaves are shed, often branched, viscid; bracts and bracteoles deciduous, often gland-ciliate;

pedicels .25-.35 in. long. *Calyx* about .2 in. long, membranous, glabrous. *Corolla* yellow, about twice as long as the calyx. *Pod* of 5-10 joints, 1.1-7 by .15-.2 in., papillose on the faces, on stalks .25-.35 in. long; lower suture indented.

Fairly common in wet grass-lands in the plains and up to 4,000 ft. in the hills.

Flrs. 9-10. Fr. 10-12.

## 2. *Æschynomene aspera* Linn. Vern. *Sola*, Beng.

A little-branched stout herb up to 12 ft. in height, the stems attaining a diam. of about 2 in.; bark greenish-grey, warty, deeper-green underneath the cuticle. *Leaves* 3-6 in. long; stipules auricled, deciduous. *Leaflets* 61-101, .3-.6 by .1-.2 in., oblong or linear, 1-nerved. *Racemes* 1.5-3 in. long, lax-flowered and often branched, clothed with bristly hairs; pedicels .1-.15 in. long, hairy. *Calyx* .3-.4 in. long, hispid, supported by a pair of hairy bracteoles. *Corolla* .6-.7 in. long, yellow, hispid. *Pod* 1.5-3 by .3 in., of 3-6 joints, each .4 in. long, indented along both sutures, echinate over the seeds.

In swamps and jheels especially in the SURMA VALLEY.

The wood is white, pith like, soft and very light. It is made into hats, toys and decorative flowers. The stems are tied together in bundles and used as rafts.

Flrs. 4-9. Fr. 10-11.

*Pycnospora hedysaroides* R. Br.—A perennial herb with trailing caespitose stems up to 2 ft. in length. *Leaves* pinnately 3-foliate; petiole flattened, sparsely ciliate; stipules free, scarious, striate. *Leaflets* stipellate, .3-1.5 in. long, obovate, pale and reticulately veined beneath. *Flowers* small, in slender terminal or axillary racemes; pedicels downy; bracts deciduous, membranous; bracteoles 0. *Calyx* about .08 in. long, deeply cleft. *Corolla* purplish, exserted. *Stamens* diadelphous (9+1). *Ovary* sessile, many-ovuled; style slender, inflexed. *Pod* about .5 in. long, turgid, 6-10 seeded, continuous, transversely veined, black when mature. *Seeds* small, minutely strophiolate.

Common in grass-lands and meadow in the KHASI HILLS above 3000 ft.

## 11. URARIA Desv.

Perennial herbs or undershrubs. *Leaves* 1-foliate or pinnately 3-9 foliate; stipules scarious, striate; stipels



subulate. *Flowers* small, purple or yellow in simple or compound often elongated terminal racemes; bracts resembling stipules; bracteoles 0. *Calyx tube* very short; limb 2-lipped; the three lower teeth elongated, setaceous. *Corolla* small; standard broad, clawed; wings falcate, adherent to the obtuse keel. *Stamens* diadelphous; style filiform, inflexed. *Pod* of 2-6, small, 1-seeded, indehiscent joints, often folded face to face. *Seeds* orbicular or globose without a strophiole.

- |   |   |
|---|---|
| I. Upper leaves 5-9 foliolate. Leaflets linear, variegated. Racemes terminal, simple, dense, up to .7 in. across. . . . .   | 1. <i>U. picta</i> .                                  |
| II. Upper leaves 3-7 foliolate. Leaflets oblong, generally not variegated. Racemes terminal, simple, dense, up to 1.5 in. across. . . . .   | 2. <i>U. crinita</i> .                                |
| III. Upper leaves 1-3 foliolate. Leaflets oblong or elliptic :—<br>Racemes terminal and axillary, simple, dense, lower calyx teeth much longer.<br>Racemes terminal, paniced, lax;<br>calyx teeth subequal. . . . . | 3. <i>U. alopecuroides</i> .<br>4. <i>U. hamosa</i> . |
| IV. Usually all leaves 1-foliate. Leaflets oblong-lanceolate. Racemes terminal, simple, dense. . . . .  | 5. <i>U. prunellæfolia</i> .                          |

### 1. *Uraria picta* Desv.

A little-branched erect undershrub, 3-6 ft. high; stems terete, finely downy. *Leaves* very variable; the lowermost simple, small, orbicular, followed by 3-5-7-9-foliate leaves with linear leaflets mixed with a few 1-foliate ones; common petiole 3-4.5 in. long, downy; stipules up to .9 in. long, obliquely ovate or lanceolate, sharply long acuminate. *Leaflets* 3-7 by .3-1 in., linear, rigidly subcoriaceous, glabrous and variegated with irregular greyish blotches along the midrib above, harshly pubescent and strongly net-veined beneath, minutely mucronate, generally rounded at the base; lateral nerves about 10 on either half, very oblique; petiolules very short, downy; stipels subulate, longer than the petiolules. *Racemes* terminal, simple, very dense and hairy, 3-10 in. long and .5-.7 in. across; bracts scariose, deciduous, gradually narrower upward; pedicels .2-.25 in. long, abruptly incurved at the tip after flowering, clothed with

bristles. *Calyx* deeply divided; lobes subulate, feathery with spreading bulb based hairs. *Corolla* purple, exserted. *Pod* of 3-6 polished joints.

In drier grass-lands in the plains of LOWER ASSAM and up to 4000 ft. in the HILLS.

Flrs. 6-9. Fr. 9-10.

## 2. *Uraria crinita* Desv. Vern. *Dieng-kha-riu*, Khasi.

A shrub 3-6 ft. high; stems stout, striate, strigose with hooked hairs when young. *Leaves* 6-10 in. long; common petiole ribbed; stipules .4-.6 in. long, broadly subulate, striate, rusty-shaggy. *Leaflets* 3-7, 2-5 by 1-2 in., oblong, acute or subacute at the apex, minutely mucronate, generally rounded at the base, coriaceous, smooth, glabrous and usually without blotches above, strongly net-veined and pubescent along the nervules beneath; lateral nerves generally 10 on either half, arched. *Racemes* terminal, simple, 2-14 in. long and .8-1.5 in. across, very hairy; pedicels .5-.6 in. long, shaggy with spreading brown bristles; bracts densely ciliate. *Calyx* shaggy; segments plumose with spreading hairs. *Corolla* .3-.4 in. long, purple, delicately veined. *Pod* of 4-6 opaque joints.

Appears to be confined to the KHASI HILLS up to 4,000 ft., generally in open grass-lands.

The roots are used to intoxicate or kill fish.

Flrs. 10-11. Fr. 12-2.

## 3. *Uraria alopecuroides* Wight. Syn. *U. lagopus* F. B. I. Vern. *Dieng-soh-mulh*, *Jermei-soh-phlang*, Khasi.

An undershrub 3-4 ft. high with dark-brown woody root stock and somewhat hispid stems; young parts pubescent. *Leaves* 4-7 in. long; rachis pubescent; stipules .3-.4 in. long, broadly deltoid-subulate, hairy; stipels subulate. *Leaflets* generally 3, sometimes solitary, 2-4 by 1-2 in., terminal largest, oblong to ovate-elliptic; apex obtuse, rounded or slightly emarginate, shortly mucronate, rounded or very slightly cordate at the base, chartaceous, green and hispid with scattered hairs above, pale and softly pubescent chiefly along the nerves and nervules beneath, often very lightly

variegated along the midrib; lateral nerves 8-12 on either half, slightly arched, tertiaries not so strong as in the last two species; petiolules very short, stout, shaggy with rusty hairs. *Racemes* generally terminal, 3-9 in. long and 1-1.3 in. across, not so dense as in the two foregoing species; pedicels .5 in. long, densely crinate, up-turned at the apex after flowering; bracts up to .35 in., obliquely suborbicular ovate to lanceolate, acuminate, ending in a sharp point, striate hairy outside, margins ciliate, imbricating and conspicuous in bud, early deciduous. *Calyx* .15-.2 in. long, almost concealed in dense spreading hairs; lower teeth much longer than upper. *Corolla* .2 in. long, deeply purple. *Pod* of 2-8 blackish or greyish joints, about .1 in. diam.

The hairs of this plant and possibly to some extent of the other species also, exude beads of saltish sap.

KHASI HILLS and the plains of LOWER ASSAM, chiefly in grass-lands and forest glades.

Fls. 9-10. Fr. 11-12.

#### 4. *Uraria hamosa* Wall. Vern. *Salpan*, Beng.

An undershrub 3-5 ft. high resembling some species of *Desmodium*; young branches pubescent; hairs both straight and hooked. *Leaves* 1-or 3-foliolate; stipules setaceous. *Leaflets* 2-6 by 1-3 in.; lateral much smaller than the terminal, oblong elliptic or ovate-lanceolate, chartaceous, rounded or slightly cordate at the base, tapering to the obtuse apex, green and glabrescent above, fulvous hairy on the nerves beneath; lateral nerves 10-18 on either half, sub-parallel; stipels setaceous. *Racemes* paniced, 6-12 in. long, glandular pubescent and hairy, covered when young with imbricating ovate cuspidate, ciliate, bracts which are adpressed silky outside and caducous before flowers open and about .45 in. in length; pedicels up-turned in fruit, 1-3 together, often in pairs. *Calyx* .1-.12 in. long, hairy; teeth subequal, longer than the tube. *Corolla* .2-.35 in. long. *Pod* of 4-8 brown, puberulous joints.

In grassy ravines in sal areas.

The decoction of the leaves in combination with some other drugs is used as a febrifuge.

Flrs. 8-10. Fr. 10-12.

*U. neglecta* Prain. (*U. Lagopus* F. B. I. II. 156 partly, not of DC.)

An erect herb, rather shrubby rusty, usually bifoliate. *Leaflets* oblong, 1.2 in. by .6-1 in., short petiolate or sessile; lateral nerves distinct, 7-11 on either half. *Heads* densely flowered, cylindric; bracts pubescent, deciduous; joints of pod shining, pale, quite glabrous.

Probably occurs in the similar localities to that of *Uraria hamosa*; Aka Hills (No. 15316).

*U. clarkei* Gagnep. incl. *U. Lacei Craib*.

A shrub about 4 ft. high with ferruginous, hairy, more or less sulcate stems. *Leaves* pinnately 3-foliate; common petiole .75-1.4 in. long, hairy, channelled above; stipules about .4 in. long, subulate, filiform; leaflets 4.5 by 1.5-2 in., terminal largest, ovate-lanceolate, obtuse, mucronate at the apex, chartaceous, sinuate, adpressed pubescent with somewhat harsh hairs above, pilose beneath, specially on the nerves; lateral nerves 10-13 on either side of midrib; petiolules short. *Flowers* in terminal ferruginous panicles up to 14 in. long; bracts densely imbricate, caducous, ovate acuminate, about .25 in. long. *Calyx* about .15 in. long; lobes lanceolate, acute, two upper short. *Standard* .25 in. long; wings slightly shorter than the keel, which is about .3 in. long. *Pod* upto 6 jointed, glabrescent with age.

NAGA HILLS,—Meebold! Kohima.—C. B. Clarke (No. 40924E).

Fls. 10-11. Fr. 12.

## 5. *Uraria prunellæfolia* Grah. Vern. *Mirong-rondai*, Mech.

An undershrub scarcely exceeding 2 ft. in height with a woody root stock; branches slender, hairy when young; tap root fusiform, orange-yellow. *Leaves* 1-foliate; petiole .1-6 in. long; stipules upto .5 in. long, triangular, acuminate, striate. *Leaflets* 2-6 by .5-3 in., oblong or lanceolate, obtuse or acute, generally rounded at the base, chartaceous, glabrous or glabrescent above, somewhat harshly pubescent along the nerves beneath; margins ciliate; lateral nerves 10-12 on either half, obliquely arched; tertiaries prominently reticulate. *Racemes* terminal, rarely lateral, simple, 1-3 by .6-8 in., somewhat lax, densely covered with short hairs. *Flowers* in fascicles of 2-3, bluish purple; pedicels .3-5 in. long, covered with short hooked and spreading bulb-based hairs; bracts acuminate, ciliate. *Calyx* about .15 in. long, hairy; lower teeth much longer than the upper. *Corolla* bluish purple, about .2 in. long. *Joints* of pod 3-6, spirally coiled, sparsely hairy.

In grass-lands in GOALPARA and perhaps throughout LOWER ASSAM.

Macerated green roots mixed with unboiled milk are given with good results in black water fever (G. N. Simeon).

Flrs. 9-10. Fr. 10-12.

**Alysicarpus Wallichii W. & A.**

A diffuse herb, almost glabrous. *Leaves* 1-foliolate. *Leaflets* about 1 in. (1.3 in. Hook). *Flowers* small in terminal racemes. *Pod* turgid, moniliform.

Aka Hills. (15317).

**12. DESMODIUM Desv.**

Herbs or shrubs. *Leaves* pinnately 3-foliolate or 1-foliolate; stipules free. *Leaflets* stipellate. *Flowers* small, usually in axillary or terminal racemes, less often in axillary umbels or fascicles. *Calyx* campanulate or turbinate, the two upper teeth often subconnate. *Corolla* exserted; standard obovate or orbicular; wings obliquely oblong, more or less adhering to the keel; the petals of which are obtuse, sometimes spurred. *Stamens* usually diadelphous (9+1); upper stamen entirely or partially free; anthers uniform. *Ovary* sessile or stalked, few or many-ovuled; style incurved; stigma capitate. *Pod* of several 1-seeded usually indehiscent joints, rarely joints dehiscent along one suture or pod dehiscing as a whole along the lower suture. *Seeds* compressed, reniform, without a strophiole.

**ARTIFICIAL KEY.**

Pods distinctly jointed; joints articulate not continuous, 1-seeded :—

A. Leaves 3 foliolate :—

1. Flowers umbelled :—

Bracts minute, deciduous. Pod of 4-5 joints; branchlets triquetrous, densely grey silky. . . . .

1. *D. Cephalotes*.

Bracts large, foliaceous, persistent, hiding the umbels. Pod usually 2 jointed; branchlets terete, finely grey downy. . . . .

2. *D. pulchellum*.

2. Flowers racemed :—

Joints of pod indehiscent :—

i. Pods 6-12 jointed :—

- \* Joints of pod with hooked hairs :—  
 + Leaflets not sinuate; joints of pod about twice as long as broad :—  
   Leaflets shining above; pods pendulous, 2-3 in. long, joints 6-10. .. 3. *D. laburnifolium*.  
   Leaflets not shining above; pods not pendulous, usually 1-1.5 in. long; joints 6-10. .. 4. *D. laxiflorum*.  
 ++ Leaflets sinuate at least on the upper half, joints of pod slightly longer than broad or length and breadth nearly equal :—  
   Branchlets densely pubescent; pod .5-.8 in. long, joints 6-8; racemes 2-3 in. long. .. 5. *D. sequax*.  
   Branchlets puberulous; pod 1-1.5 in. long; joints 8-12; racemes 4-6 in. long. .. 6. *D. sinuatum*.  
 \*\* Joints of pod appressed pubescent or glabrescent :—  
   Pod glabrescent, 1-2 in. long, upper suture straight, indented on lower suture; joints 8-10; branchlets terete, glabrescent; leaflets minutely adpressed pubescent beneath. .. 7. *D. racemosum*.  
   Pod densely adpressed pubescent, .8-1.2 in. long, indented on both sutures, more deeply on the lower, joints 6-8; branchlets angled, densely pubescent along the angles; leaflets densely grey silky beneath. .. 8. *D. sambuense*.  
 ii. Pods 3-6 jointed, upper upto twice as long as broad :—  
   Branchlets angled; stipules .15-.2 in. long; leaflets cuspidate acuminate; pod 1-1.8 in. long, 3-6 (rarely upto 8) jointed, joints glabrescent. .. 9. *D. khasianum*.

Branchlets terete; stipules  
·3-·5 in. long; leaflets rounded  
at both ends; pod 1 in.  
or less, joints 4-6, minutely  
downy. . . . .

- iii. Pods 1-4 jointed, joints 2-3  
times as long as broad :—

\* Lowest joint of pod stalked,  
pod under 1 in. long, joints  
1-3, more or less crescent or  
scimitar shaped, constrictions  
reaching from lower to upper  
suture or near its racemes  
lax :—

Pod 1-2 jointed; stalk  
about ·3 in. long; corolla  
small, ·12 in. long; stipules  
small, subulate, deciduous;  
bracts minute, linear; pedi-  
cels ·2 in. long. . . . .

10. *D. concinnum*.

Pod 1-3 jointed, stalk short  
about ·1 in.; corolla large  
·2-·4 in. long; stipules  
·25-·4 in. long, lanceolate,  
persistent; bracts ·15-·2  
in. long, ovate-lanceolate;  
pedicels ·2-1·5 in. long. . . . .

11. *D. laxum*.

\*\* Lowest joint of pod not  
stalked; pod over 1 in. long,  
joints more or less straight;  
constrictions reaching half or  
a little more to the upper  
suture; racemes dense :—

Pod 3-4 jointed; corolla  
large; pedicels up to  
·25 in. long. . . . .

12. *D. Scalpe*.

Joints of pod more or less dehiscent  
along the lower suture :—

Joints 5-8, slightly broader than  
long or length and breadth equal,  
reticulate, with hooked hairs  
along the sutures. . . . .

13. *D. confertum*.

14. *D. polycarpum*.

B. Leaves 1 foliolate :—

1. Petiole not winged :—

- a. Joints of pod twice or more as long  
as broad :—

Pods pendulous, 6-8 jointed;  
branches 3-quetrous. . . . .

15. *D. ormocarpoides*.

- b. Joints of pod less than twice as  
long as broad :—

- Branchlets slightly angled; grey downy leaflet ovate or lanceolate, entire, glabrescent above, joints of pod 6-10, slightly longer than broad. . . . . 16. *D. gangeticum*.
- Branchlets terete, brown pubescent; leaflet broadly ovate or deltoid, more or less repand. hispid on the upper surface, joints of pod 3-6, slightly longer than broad. . . . . 17. *D. latifolium*.
- Branchlets terete, rounded, glabrescent, joints of pod 3-5, as long as broad; leaflets entire, orbicular-cordate; pedicels sharply reflexed. . . . . 18. *D. retroflexum*.
2. Petiole broadly winged :—  
 Branchlets 3-angular; joints of pod 6-8, square. . . . . 19. *D. triquetrum*.
11. Pod indistinctly jointed, dehiscing in a continuous line along the lower suture, joints not separating :—  
 Leaves 1-3 foliolate; flowers comparatively large :—  
 Under shrub 3-5 ft. high; side leaflets if present minute; pod glabrescent. . . . . 20. *D. gyrans*.
- Shrub attaining 10 ft.; side leaflets fairly well developed; pod persistently hairy. . . . . 21. *D. gyroides*.

**1. Desmodium Cephalotes** Wall. Vern. *Gohate-jhar*, *Bon-landu*,\* *Makhiloti*, Ass.; *Sambraphong*, Garo; *Dangshikhop*, Mech; *Non-the*, *Non-chang-pher*, Mik.; *Samrong-thep*, Kach.; *Thing-kani*, Kuki; *Kakhang-skei*, Khasi.

A shrub 4-6 ft. high with grey bark; branches zig-zag, sharply 3-quetrous, densely grey-silky. *Leaves* 3-foliate; petiole 1-2 in. long, deeply furrowed, grey-downy; stipules caducous, about .8 in. long, linear-lanceolate. *Leaflets* 3.5-6 by 1.5-2.5 in., terminal usually largest, oblong or elliptic, acute at both ends, subcoriaceous, green and glabrous above, densely grey-silky beneath; lateral nerves 10-20 on either half, oblique, parallel, straight, very prominent beneath. *Flowers* .3-.4 in. long in dense short

\* Landu—Arahar-dal plant (*Cajanus indicus* Spreng).



peduncled axillary umbels; umbels usually solitary but sometimes on short leafless branches; peduncles upto .3 in. long; bracts caducous, hairy outside, dry, linear-oblong; bracteoles linear or setaceous; pedicels .1 in. long, short jointed at the apex. *Calyx* .15 in. long; teeth lanceolate; lower most longest. *Corolla* red, .25 in. long. *Pod* about 1 in. long. indented along both sutures. densely grey-silky; joints 4-5, about as long as broad.

Fairly common in sal areas, chiefly in glades; cattle and goats eat the leaves, but the pods are said to be poisonous for cattle.

Fls. 7-8. Fr. 11-1.

**2. *Desmodium pulchellum* Benth. Vern. *Ursi*, Ass. (Sibs.); *Takamala* (string or rupees), *Jharua*; *Jata-salpar*, Beng. & Sansk.**

A shrub 4-6 ft. high; branches ribbed, grey downy, specially when young. *Leaves* 3-foliolate; rachis about 1 in. long; stipules subulate. *Lateral leaflets* 1.5-2.5 by .6-1 in., on petiolules .05-.08 in. by *terminal* 2.5-4 by 1.2-1.5 in., both elliptic-oblong or ovate-lanceolate, generally acute at the apex, more or less rounded at the base; lateral nerves 8-10 on either half, slanting, slightly arched. *Flowers* .2-.3 in. long in 2-6 flowered umbellate clusters, each being subtended by a pair of persistent, obliquely orbicular, foliaceous, strongly nerved, subcoriaceous bracts, .3-.5 in. across, placed back to back on a densely pubescent stalk ending in a long fine point, the umbels being arranged in axillary or terminal plicate racemes, 4-10 in. long. *Calyx* .1 in. long; teeth shorter than the tube. *Corolla* .25 in., white, tipped with light red. *Pod* of 1 or 2 joints, about .15 by .12 in., very thin, delicately veined, indented along both the sutures, glabrate or downy.

Common in the plains of ASSAM, generally in Sal areas or other types of deciduous forests, as far up as SIBSAGAR.

It is generally believed that if a branch of this plant is kept under the bed or anywhere in the house it drives away bed-bugs from it.

Fls. 7-9. Fr. 11-1. leafless in March.

**3. *Desmodium laburnifolium* DC. Vern. *Biyoni-haputa* or *Bor-Biyoni-haputa*, Ass. (Dan.); *Tangam-asing*,**

Miri; Samthai, Mech; Kobuelchick, Kuki; Bhuter-chira, Beng.

A lanky shrub 6-8 ft. high; branches few, slender, terete or imperceptibly angled, glabrescent. *Leaves* 3-foliolate; common petiole .8-1.5 in. long, channelled; stipules .2-2.5 in. long, free, subulate. *Leaflets* 1-4 by .4-1.5 in., terminal usually largest, oblong-lanceolate, subcoriaceous, slightly pubescent along the nerves above, otherwise glabrous, dark-green and shining above, pale and sparsely adpressed, pubescent beneath. *Racemes* 4-12 in. long, lax; pedicels .2-3 in. long. *Calyx* .1-1.5 in. long; teeth lanceolate, as long as the tube, the lowest linear and longer than the others. *Corolla* whitish, .25-3.5 in. long. *Pod* 2-4 by .15-2 in.: joints 6-8, .3-4 in. long, covered with short hooked hairs by means of which they stick to clothes and to the bodies of animals.

Brahmaputra Valley right up to Sadiya and in the Hills up to 4,000 ft., generally in shady damp localities.

Flrs. 6-9. Fr. 9-1.

**4. *Desmodium laxiflorum* DC. Vern. Khong-sir, Khasi.**

An erect undershrub 3-5 ft. high; branches angled, adpressedly grey-hairy. *Leaves* 3-foliolate, 6-10 in. long; common petiole 1.5-2 in. long, sulcate, grey-hairy; stipules persistent, .4-6 in. long, subulate, striate, hairy. *Leaflets* 4-8 by 2-3 in., terminal largest, lateral somewhat oblique, ovate, ovate-elliptic or lanceolate, cuspidate-acute or shortly acuminate; base rounded, membranous, green and scabrid, puberulous above, somewhat pale and glaucous and more densely hairy beneath, ciliate along the marginal nerve; lateral nerves 10-12 on either side of the midrib, prominent, joining to form a marginal nerve; lateral petiolules .1-1.5 in. long, short, hairy; stipels persistent, .2-3 in. long, setaceous, grey. *Racemes* axillary and terminal, sometimes paniced, 6-15 in. long, lax-flowered, except towards the extremity; flowers fascicled; bracts lanceolate, .2-3 in. long, pedicels .2-3.5 in. long, slender, hairy, reflexed in fruit. *Calyx* about .08 in. long, densely hairy; teeth longer than the tube. *Corolla* purplish pink; standard .2 in. long,

lighter coloured than the wings and keel. *Pod* 1.1.5 by about .08 in., 6-8 jointed, scarcely constricted at the joints, covered with gland-based minute hooked hairs; joints about .2 in. long.

Sub-montane tracts in LOWER ASSAM; e.g., Barnihat, Rani, etc.; Sohrarim—Clarke, Haflong, Craib.

Flrs. 9-10. Fr. 12-1.

**5. *Desmodium sequax* Wall.** Vern. *Horu-biyoni-haputa*, Ass.; *Samthai*, Kach.

A caespitose shrub usually up to 10 ft. in height, branches terete, clothed with short brown pubescence. *Leaves* 3-foliolate; common petiole .7-1.5 in. long, sulcate, angled, densely pubescent; stipules .08 in. long, ovate, densely brown-ciliate, caducous. *Leaflets* closely resembling those of *Desmodium sinuatum* Bl. in size and shape, 1.5-3.5 by 1.2-5 in., elliptic or rhomboid, tapering to a more or less acute tip, repand in the upper half, subcoriaceous, dark green and densely grey pubescent beneath; lateral nerves 4-5 on either half, conspicuous beneath, slightly arched. *Racemes* 2-3 in. long, terminal and axillary, rather lax, sometimes paniced; pedicels .15-.2 in. long, pubescent; bracts minute. *Calyx* about .08 in. long, broadly funnel-shaped, hairy outside; teeth deltoid, very short, strongly ciliate. *Corolla* light purple, about .3 in. long. *Pod* .5-.8 by .1 in., indented along both sutures; joints 6-8, rhomboid or lentil-shaped, as broad as long, soon separating, densely clothed with short hooked brown hairs.

SUB-HIMALAYAN TRACTS and the KHASI HILLS upto 5,000 ft. Nonai in DARRANG, Matharguri, Rajakata, etc., KAMRUP, Duragiri, GARO HILLS.

Flrs. 9-10. Fr. 12-1.

**6. *Desmodium sinuatum* Bl.**

An undershrub 6-8 ft. high; branches terete, indistinctly sulcate, minutely puberulous. *Leaves* 3-foliolate, 2-6 in. long; common petiole .5-1.5 in. long, sulcate, rusty hairy; stipules about .1 in. long, deltoid, closely ciliate. *Leaflets* 1.5-3.5 by 1.2-5 in., elliptic or rhomboid, acute, repand in the

upper half, subcoriaceous, dark-green and lightly adpressed hairy above, pale and grey-velvety beneath; lateral nerves usually 4 on either side of the midrib, oblique, much arched. *Racemes* 4-6 in. long, terminal and axillary, often branched; pedicels .15-.25 in. long, ascending or spreading, rusty-downy; bracts about .1 in. long, caducous. *Calyx* .08 in. long; teeth short, rounded. *Corolla* purple, about .25 in. long. *Pod* 1.1-1.5 by .08-.12 in., clothed with minute hooked brown hairs; joints 8-12, as broad as long.

KHASI HILLS, 3,000-5,500 ft., generally in shady ravines e.g., Un-ja-sai in Upper Shillong.

Flrs. 8-9. Fr. 11-12, but apparently remaining long on the plant after ripening.

**7. *Desmodium racemosum* (Thunb) DC. Vern. Ja-top-rit, Khasi.**

A handsome undershrub 4-5 ft. high; branches slender, terete, glabrescent. *Leaves* 3-foliolate; common petiole 1-2 in. long, thinly adpressed-hairy; stipules .1-.15 in. long, ovate or lanceolate. *Leaflets* 1.4 by .5-1.3 in., elliptic or lanceolate, sharply acute, entire or obscurely repand, membranous, light-green and glabrescent above, pale and very minutely adpressed pubescent beneath; lateral nerves 4-6 on either half, very slender, arched; lateral petiolules .1-.15 in. long, hairy; stipels .1 in. long, bristle-like. *Racemes* terminal and lateral, much paniced and corymbose, 2-5 in. long; pedicels capillary up to .6 in. in length, ascending; bracts .25-.3 in. long, lanceolate, cuspidate-acuminate, densely silky, caducous. *Calyx* about .1 in. long, sub-glabrous; teeth deltoid. *Corolla* pink, glabrous, about .3 in. long; standard obovate. *Pod* 1-2 by .2 in., on a short stout stalk, glabrescent, indented along the lower suture, the upper suture being nearly straight; joints 8-10, slightly longer than broad, rather strongly veined.

KHASI AND JAINTIA HILLS, 5-6,000 ft.

Flrs. 7-8. Fr. 9-11.

This plant has been described as *D. oxyphyllum* DC. in F. B. 1., but this name applies to a different plant (*vide* Prain. Journal As. Society, Bengal LXVI-2). The name adopted is the one under which the Calcutta herbarium sheets have been identified by Schnieder.

**8. *Desmodium sambuense* DC. Syn. *D. floribundum* G. Don. Vern.; *Ja-kythem*, *Ja-thoh*, Khasi.**

A woody shrub 3-5 ft. high; branches angular, often switchy, densely pubescent along the ridges. *Leaves* 3-foliolate, 4-8 in. long; common petiole 1-2 in. long; sulcate, grey-silky; stipules .25-.4 in. long, lanceolate, cuspidate, paleaceous, strongly ciliate. *Leaflets* 1-3 by .6-1.5 in., ovate or obovate-oblong, acute or subacute, usually cuspidate, subcoriaceous, green and lightly adpressed hairy above, pale and densely grey-silky beneath; lateral nerves 6-8 on either half, nervules finely reticulate; petiolules about .1 in. long; stipels small, subulate. *Racemes* terminal and axillary, often panicle, 3-6 in. long; flowers in fascicles of 3-5 at the nodes; pedicels .2-.4 in. long, slender, hairy, ascending; bracts resembling the stipules, narrower upwards. *Calyx* .12 in. long, turbinate, hairy; teeth as long as the tube. *Corolla* .35-.4 in., pink or nearly white. *Pod* .8-1.2 by .12 in., indented along both sutures; joints 6-8, slightly longer than broad, clothed with adpressed short hairs.

Fairly common in the BRAHMAPUTRA VALLEY upto SIBSAGAR also in the KHASI HILLS upto 5,000 ft.

Flrs. 8-9. Fr. 9-10.

**9. *Desmodium khasianum* Prain. Vern. *Deing-chakuriao*, Khasi.**

A shrub 3-6 ft. high; stem grey, branches trigonous, sulcate; young parts silky pubescent. *Leaves* 3-foliolate; common petiole .7-1.4 in. long, sulcate, adpressed hairy; stipules .15-.2 in. long, lanceolate, cuspidate-acuminate, striate, ciliate. *Leaflets* 3, .8-2.5 by .5-1.5 in., ovate obovate or elliptic, acute or shortly cuspidate-acuminate, subcoriaceous, green and lightly adpressed hairy above, pale and densely hairy beneath; lateral nerves 5-6 on either half, arched, rather indistinct above; stipels about .1 in. long, setaceous. *Racemes* axillary or terminal, 3-5 in. long, solitary or in tufts of 5-6 pedicels, capillary, .3-.7 in. long. *Calyx* about .1 in. long, funnel-shaped, deeply divided, glabrous. *Corolla* purple, about .3 in. long; keel straight. *Pod* 1-1.8 by .1-.2 in., nearly straight along the upper suture, scalloped along the lower; joints 3-6 (less often upto 8), half

as long again as broad, reticulately veined on the faces, adpressed-hairy when young, glabrescent.

KHASI HILLS 4, -5,500 ft., e.g., Mawmlah, Lynkyrdem, Nongstoin, Nongbri, etc.

Flrs. 8-9. Fr. 10-12.

### 10. *Desmodium concinnum* DC.

A handsome shrub with slender terete drooping branches; young parts grey-pubescent. *Leaves* 3-foliolate, common petiole .5-1 in. long, sulcate, covered with spreading hairs; stipules .3-.5 in. long, broadly subulate, paleaceous, striate. *Leaflets* 1-3 by .5-1 in., oblong, oblong-obovate or elliptic-oblong, rounded at both ends, minutely mucronate, subcoriaceous, green and glabrate above, pale and clothed with matted adpressed grey hairs beneath; lateral nerves 5-10 on either half, prominent beneath, very oblique, slightly arched; petiolules .05-.08 in. long; stipels setaceous, about .25 in. long. *Racemes* 3-9 in. long, terminal and at the ends of lateral branchlets or axillary, lax pilose; pedicels .3-.6 in. long, ascending or spreading, densely grey-pubescent; bracts .25-.4 in. long, ovate-lanceolate, shortly awned, striate, imbricating, densely silky, especially outside, caducous. *Calyx* .1 in. long, campanulate; teeth deltoid, rather short. *Corolla* pinkish or lilac, .25-.35 in. long. *Pod* about 1 by .12 in., straight along the upper suture; joints 4-6, minutely downy.

KHASI HILLS, 4,000 ft. in open grass-lands.

Flrs. 9-10. Fr. 11-12.

### 11. *Desmodium laxum* DC. Syn. *D. podocarpum* DC. Var. *laxum* Baker.

An erect usually unbranched semiherbaceous undershrub 2-3 ft. high; stem angular, minutely pubescent. *Leaves* 3-foliolate; common petiole 2-4 in. long; stipules small, subulate. *Leaflets* 3-6 by 1.5-3 in., lateral obliquely lanceolate, terminal ovate-lanceolate, shortly acuminate or acute; base narrowed, usually cuneate, membranous or chartaceous, somewhat hispid at first, but glabrescent when mature, green above, pale beneath; lateral nerves about 4 on either half,

much arched, the lowest sub-basal; lateral petiolules  $\cdot 2\cdot 25$  in. long, pilose; stipels setaceous. *Racemes* 9-15 in. long, axillary and terminal, often paniced, very lax; bracts minute, linear. *Calyx*  $\cdot 06$  in. long, turbinate, almost truncate, the teeth being very minute. *Corolla* pink,  $\cdot 12$  in. long. *Stamens* 1-adelphous. *Pod* 1-2-jointed, lowest joint on stalk,  $\cdot 3$  in. long; each joint  $\cdot 3\cdot 35$  by  $\cdot 15\cdot 2$  in., obliquely crescent-shaped or subtriangular, the lower suture almost touching the upper between the seeds; both sutures thickened, the upper also flattened.

Carampani in SIBSAGAR.

Flrs. 8-9. Fr. 11-12.

In var. *typica* leaflets are smaller, 1-2-3 in. long. KHASI and JAINTIA HILLS, 4-5,000 ft. Mann !

## 12. *Desmodium Scalpe* DC.

An undershrub 2-4 ft. high; branches terete, slender, patently downy. *Common petiole*  $\cdot 5\cdot 1$  in. long, flattened, ciliate; stipules  $\cdot 25\cdot 4$  in. long, lanceolate, persistent. *Leaflets* 3,  $\cdot 5\cdot 4$  by  $\cdot 3\cdot 3$  in., suborbicular or oblong-obovate, often emarginate, membranous, green and glabrate above, pale and finely downy beneath; lateral nerves about 8 on either half, very slender, slightly arched; lateral petiolules  $\cdot 05\cdot 1$  in. long. *Racemes* mostly terminal, 2-12 in. long, very lax, pedicels filiform,  $\cdot 2\cdot 1\cdot 5$  in. long; bracts caducous,  $\cdot 15\cdot 2$  in. long, ovate-lanceolate, caudate, striate, ciliate on the margins. *Calyx* about  $\cdot 1$  in. long, downy. *Corolla* bright-red,  $\cdot 2\cdot 4$  in. long. *Pod* of 1-3 joints. *Joints*  $\cdot 2\cdot 25$  by about  $\cdot 1$  in., half-rhomboidal; apex oblique; upper suture thickened.

Apparently rare; KHASI HILLS, upto 4,000 ft.

Flrs. 8-9. Fr. 11-1.

## 13. *Desmodium confertum* DC.

An undershrub; branches terete, finely downy when young. *Common petiole* 1-1-5 in. long. *Leaflets* 3, 2-6 in. long, obovate or oblong, sub-coriaceous, glabrous above, pale, distinctly reticulate veined and minutely hairy beneath. *Racemes* axillary and terminal, the latter usually paniced, short, dense; bracts  $\cdot 2\cdot 25$  in. long, scariose; pedicels  $\cdot 15\cdot 2$

in. long, ascending. *Calyx* .1-.15 in. long, turbinate, shortly toothed, scarcely hairy. *Corolla* .35-.4 in. long. *Pod* 1.1-5 by .2-.25 in., much indented along the lower suture; joints 3-4, twice as long as broad, densely clothed with spreading silky hairs.

KHASI HILLS upto 4,000 ft., apparently in grass lands.

#### 14. *Desmodium polycarpum* DC.

An undershrub 2-4 ft. high with a creeping root-stock; branches somewhat sulcate or angular, with adpressed hairy extremities. *Leaves* 3-foliate; common petiole stout, slightly margined; stipules about .5 in. long, subulate, setaceous. *Leaflets* sub-equal, 1.2-5 by .6-1.2 in., elliptic, oblong or obovate, rounded or slightly notched at the apex, sub-coriaceous, green and glabrous above, paler glaucescent and thinly adpressed-hairy beneath; lateral nerves 7-9 on either half, slender, slanting, arched; tertiaries more slender, very close, transverse, sub-parallel; petiolules of lateral leaflets about .1 in. long, grey-silky; stipels .15-.25 in. long, setaceous, very slender. *Racemes* terminal and axillary. 2-4 in. long, rather dense; bracts caducous, closely imbricating in bud, .15-.25 in. long, concave, lanceolate or ovate lanceolate, awned, striate, ciliate; pedicels capillary, erect, about .2 in. long. *Calyx* .08-.1 in. long; teeth longer than the funnel-shaped tube. *Corolla* purple, .2-.25 in. long. *Pod* .5-.8 by .1-.12 in., very thin, ciliate with hairs curled at the tips along the sutures; upper suture nearly straight; joints 5-8, slightly broader than long or length equalling breadth, reticulate, opening by the lower suture.

SIBSAGAR—Gaurisagar; KHASI HILLS, 4-5,000 ft.

Flr. and Fr. 6-8.

The pods stick together and persist long after ripening.

Var. *trichocaulon* also occurs in the KHASI HILLS, and differs from the type by its spreading hairs on the branches, laxer racemes, broader ovate-cuspidate bracts and larger and more densely hairy pods.

There is an intermediate form between these in which the hairs at the extremities are spreading, and bracts and pods as in the type.

Mamloo Forests—4,000 ft.



**15. Desmodium ormocarpoides DC.**

A slender erect undershrub; stem usually unbranched, angled, downy when young. *Leaves* 1-foliate; petiole .5-1 in. long; leaflet 4-7 in. long, ovate or lanceolate, chartaceous or subcoriaceous, somewhat downy beneath. *Racemes* terminal, 6-9 in. long; flowers in few-flowered distant fascicles; bracts minute, setaceous; pedicels .25-.35 in. long. *Calyx* .08 in. long, with short deltoid teeth. *Corolla* pale-violet. *Pod* pendulous, 3-4 by about .25 in., constricted along both the sutures; joints 6-8, flattened, at least twice as long as broad, ribbed, covered with minute hooked hairs.

Gauhati, Kurz ! MANIPUR, Meebold ! and possibly in many other similar localities.

Flowering and fruiting time not known.

**16. Desmodium gangeticum DC. Vern. Nai-khong, Khasi; Salpan or Saluani, Beng.; Sala-parni, Sans.**

A suberect undershrub 3-4 ft. high; branches sub-terete, grey-downy towards the extremities. *Leaves* 1-foliate; petiole .5-1.3 in. long; stipule .2-.35 in. long, subulate, striate, ciliate. *Leaflets* 2-4 by 1.5-2 in., ovate to lanceolate or elliptic lanceolate, acute, rounded at the base, membranous or chartaceous, glabrous or puberulous along the nerves and somewhat shining above, adpressed grey hairy or glaucescent beneath; lateral nerves 8-10 on either half, nearly straight; stipels setaceous. *Racemes* 6-12 in. long, mostly terminal or from upper axils, slender, often with short lateral branches, rather lax, pubescent, usually with reflexed hairs pointing upwards; pedicels .08-.2 in., ascending, strigillose; bracts minute, setaceous. *Calyx* .08 in. long; teeth lanceolate, longer than the tube. *Corolla* about .2 in. long, purplish white. *Pod* .5-.7 by about .1 in., deeply indented along the lower suture; joints 6-8, slightly longer than broad, usually clothed with minute hooked hairs.

SUB-MONTANE tracts upto 4,000 ft.

The root of this plant is used as a febrifuge by Hindu physicians.

Fls. 8-10. Fr. 10-12.

**17. *Desmodium latifolium* DC.** Vern. *Gach-bionihaputa*, Ass.; *Bagh-chhala*, Tharua; *Soh-pyrtheit*, *La-hniu*, Khasi; *Nonth-arong*, Mik., *Achhak-kimachan*, Garo.

An undershrub 4-6 ft. high; branches terete, striate, densely hirsute. *Leaves* 1-foliolate; common petiole .3-.6 in. long, densely hairy; stipules .2-.3 in. long, subulate. *Leaflets* 2-5 by 1.5-3.5 in., broadly ovate, obtuse to subacute tip, generally mucronate; base truncate or cordate, chartaceous, hispid with stiff white hairs above, densely soft-pubescent beneath; lateral nerves 7-8 on either side, the first 1-3 of which are subbasal; stipels setaceous. *Racemes* 2-6 in. long, axillary or terminal, the latter often paniced, ascending, rather congested; bracts densely brown, hairy, .2-.25 in. long, linear subulate, plumose hispid; pedicels very short. *Calyx* .08 in. long, campanulate, hairy; teeth lanceolate to triangular, about equalling the tube. *Corolla* purplish, .25-.35 in. long. *Pod* .6-1 by .1 in., slightly falcate, indented along both the sutures, densely clothed with dun hooked hairs; joints usually 3-6, about as broad as long.

BRAHMAPUTRA VALLEY from Dalu and Goalpara to Lumding on the south and Charduar on the north, generally associated with Sal. The fibre of the bark can be used for manufacturing paper.

Flrs. 9-11. Fr. 11-12.

**18. *Desmodium retroflexum* DC.**

Small undershrub; branches teretè, woody with short spreading hairs when young. *Leaves* usually 1-foliolate; common petiole .5-1 in. long, deflexed at the extremity. *Leaflets* 1-2 in. diam., orbicular-cordate, coriaceous, glabrous and green above, densely adpressed-silky beneath, rarely with a pair of much smaller lateral leaflets. *Racemes* about an inch long, terminal or axillary, very dense. *Calyx* .08 in. long, bristly. *Corolla* .2-.25 in. long. *Pod* .35-.5 by .1 in., minutely hairy; joints 3-5, as long as broad.

KHASI HILLS, Jenkins!

**19. *Desmodium triquetrum* DC.** including *D. auriculatum* DC. Vern. *Ulucha*, Ass., Miri & Abor; *Euang*, Garo.

An erect or suberect undershrub, generally 3-5 ft. long

but often attaining 6-8 ft.; branches sharply triquetrous, strigose along the ridges when young. *Leaves* 1-foliolate; petiole .5-1.3 in. long by .1-.2 in., winged; wing oblanceolate, .25-.4 in. broad, ending in stiff points; stipules .5-.7 by .1-.2 in., tapering from a broad base, sub-persistent, striate. *Leaflets* 2-7.2 by .5-2.2 in., oblong-lanceolate, rounded or subcordate at the base, acute or shortly acuminate, entire, subcoriaceous, sub-glabrous or scaberulous above with scattered bristle-like white hairs and with such hairs on the midrib and nerves beneath; lateral nerves 15 to 19 on either half, usually much arched and strongly reticulate between. *Racemes* 4-12 in. long, axillary or terminal and sometimes paniced, covered with minute pubescence and with stiff adpressed hairs, specially along ridges; pedicels .1-.2 in. long, minutely hairy; bracts .2 in. long with smaller ones at the base. *Calyx* about .1 in. long, campanulate, with scattered hairs outside; two upper teeth combined forming one broad deltoid tooth; the lowest tooth linear and the longest. *Corolla* purplish pink, .2-.25 in. long; keel acute. *Stamens* monadelphous, the upper being free above the middle. *Pod* 1-2 by .2 in., flat, clothed throughout with matted hairs, slightly indented along the lower suture; joints 5-8, slightly broader or as broad as long; seeds escaping from an opening at the upper end after fall of the terminal joints.

Fairly common in the plains throughout the Province and upto 4,000 ft. in the GARO, KHASI and MIKIR HILLS. Generally in grass-lands.

The Abors and Miris of Upper Assam use the leaves as a substitute for tea.

Flrs. 10-12. Fr. 11-3.

The following are very closely allied forms and probably not more than varieties of the last :—

*Desmodium alatum* DC. incl. *D. Triquetrum* F. B. I. in part.

Shrub 4-5 ft. high. Differs from the foregoing as follows :—

*Leaves* often much narrower than in the last species; stipules more persistent, about .4-1 by .15 in. *Racemes* more densely flowered; flowers smaller, about .2 in. long, light pink with dark purple veins at the base of the petals. *Pods* broader sometimes, nearly .5 in. and much thinner, 3-7 jointed, glabrous, shining, very finely though somewhat distantly reticulate.

SYLHET—Managuli Hill, CACHAR (between Ghuttermukh and Changsil) Prazer! LAKHIMPUR—Clarke! KHASI AND JAINTIA HILLS, Mousto, Shaila (Shella?), Nongklow—Clarke.

**Desmodium pseudo-triquetrum** DC. Syn. *D. Triquetrum* F. B. I. in part.

A trailing undershrub. *Branches* 3-gonous—usually ciliate along the angle. *Leaves* smaller than those of *D. triquetrum* or *D. alatum*, glabrous or nearly so above, pilose along the nerves beneath at least till mature; lateral nerves about 8-12 on either half, wings narrower than in *D. triquetrum*; stipules .4-.8 in. by .15-.2 in. long, persistent. *Flowers* about the same size as those of *D. alatum*, but on shorter pedicels. *Pods* densely hispid along the edges, specially when young, glabrous or puberulous and finely reticulate on the sides.

North-East Frontier—Dipimukh, KHASI HILLS upto 4,000 ft., SIBSAGAR—Master! GOALPARA, Hamilton! SYLHET—Wallich! Kohima—Prain!

The leaves are used like tea by Mikirs and Abors.

Flrs. 9-10. Fr. 10-12.

**20. Desmodium gyrans** DC. Vern. *Gorachand*, Beng.; *Kali-manac*, Kh.; *Mushud-biphang*, Mech.; *Samphileng-gap*, Garo. The telegraph plant.

A semi-herbaceous and somewhat variable undershrub usually 4-5 ft. high; stems terete, indistinctly striate, green, glabrous, usually unbranched. *Leaves* normally 3-foliolate, but the lateral leaflets, if present, are reduced to very small sizes or are altogether absent, sometimes by early fall; common petiole .5-1.5 in. long; stipules .3-.6 in. long, subulate with a broad base, erect, striate. *Terminal leaflets* 1.5-4 by .3-1.5 in., oblong or oblong-lanceolate, obtuse at both ends, quite entire, rather membranous, almost glabrous and often with irregular, glaucous blotches above, glaucous and more or less densely adpressed-pubescent beneath; main lateral nerves 7-10 on either half, oblique, arched, very slender. *Lateral leaflets* when present .25-.7 by .05-.12 in., rotating by jerks under atmospheric stimulus; petiolules .06-.15 in. long, slender, stipels about the same length, very slender. *Racemes* axillary and terminal, the latter often branched, 2-6 in. long; pedicels .2-.3 in. long, finely downy; bracts about .25 in., caducous, ovate-cuspidate, concealing the flower-buds. *Calyx* about .1 in. long, campanulate; teeth deltoid, small. *Corolla* .25-.4 in. long, dull-purple. *Stamens* diadelphous. *Pod*

1.1-1.7 by .2 in., falcate, sub-glabrous or glabrescent, indented and at length continuously dehiscent along the lower suture; seeds reniform, compressed, with a prominent winged strophiole.

BRAHMAPUTRA VALLEY upto Dhansiri-mukh, and upto 5,500 ft. in the KHASI, JAINTIA and GARO HILLS, generally in grass-lands.

Fls. & Fr. 10-2.

Vari. *Roxleyi* which is a taller undershrub with larger leaves occurs in the southern parts of the JAINTIA HILLS and possibly in similar localities elsewhere

## 21. *Desmodium gyroides* DC.

A shrub 5 to 10 ft. in height closely allied to the last species; stem freely branched; branches terete, densely grey-hairy when young. *Leaves* normally 3-foliolate, but often 1-foliolate by suppression; common petiole .5-1.2 in. long; stipules .3-.7 in. long, subulate with an attenuated fine point, striate, sub-persistent. *Leaflets* .7-2.5 by .5-1.3 in., the side ones when present, being much smaller than the terminal, ovate elliptic or obovate, obtuse, sometimes emarginate at apex, membranous or chartaceous, green, often blotchy and very thinly pubescent above with minute adpressed hairs, glaucous and more or less densely adpressed hairy beneath; lateral nerves 5-7 on either half, slender, arched; stipels .15-.2 in. long, bristle-like. *Racemes* axillary and terminal, usually branched, 2-5 in. long; pedicels .2-.3 in. long, very hairy, elongating in fruit; bracts .15-.25 in. long, broadly ovate, striate, strongly ciliate, caducous. *Calyx* campanulate, about .08 in. long. *Corolla* .2-.3 in. long, purplish. *Stamens* diadelphous. *Pod* 1.1-1.5 by .15-.2 in., indented along the lower suture and dehiscing along it in scallops to set free the seeds, covered with intricate harsh brown hairs, curling up as in the last species after dehiscence; joints 3-10, as broad as or broader than long; seeds reniform, black with a winged strophiole.

Throughout the BRAHMAPUTRA VALLEY from GOALPARA to SIBSAGAR. Not noticed in LAKHIMPUR.

Fls. 10-11. Fr. 11-2.

**Desmodium parvifolium DC.**

A much-branched prostrate wiry herb; branches hairy. *Leaves* 1-3-foliolate; common petiole capillary; stipules .1-.4 in. long, scarious, striate. *Leaflets* of two kinds, the smaller generally not exceeding .15 in. in diam., orbicular and much crowded, and the larger up to .5 in. in length, ovate or elliptic, not so crowded, both glabrous above, sparsely hairy underneath; stipels microscopic. *Racemes* numerous, terminal and lateral upto 2 in. long; pedicels .3-.5 in. long, filiform, rusty, hairy; bracts about .1 in., lanceolate or ovate caudate, concave, densely pubescent. *Calyx* .1-.15 in. long; teeth subulate, long-hairy. *Flowers* blue or pinkish. *Standard* orbicular, .25 in. diam. *Stamens* 2-adelphous, alternately sterile; keel petals spurred. *Pod* .3-.5 by .1 in., indented between the joints along both the sutures; joints 2-4, rarely 1 or 5, puberulous when young, veined in a regular pattern.

Var. *macrocarpum* has pods with broader joints and the upper suture straight or nearly so.

KHASI HILLS 4,500 ft., e.g. Nongstoin, Shillong, etc.

The leaves are good as cattle fodder and are used as a vegetable in Chota-Nagpur.

Fls. & Fr. 9-11.

**Desmodium Griffithianum Benth.**

A trailing herb 1-2 ft. long, shaggy with fine spreading hairs. *Leaves* 3-foliolate; common petiole .5-1 in. long. *Leaflets* .5-1 in. long, terminal largest, obovate or oblong, sub-coriaceous, glabrous above, adpressed-hairy beneath. *Racemes* terminal, 2-6 in. long, dense towards the top; pedicels .1-.15 in. long, silky; bracts .25-.35 in. long, ovate cuspidate, densely silky. *Calyx* .1-.12 in. long, hairy; teeth deep, setaceous. *Corolla* .2-.25 in. long, bluish purple, exserted. *Pod* .5-.6 by about .1 in.; joints 4-5, obscurely downy.

KHASI HILLS, 4,500 ft.

**Desmodium triflorum DC.**

A caespitose and much branched trailing perennial herb upto 2 ft. in length, often rooting at the nodes, covered with fine spreading hairs. *Leaves* 3-foliolate, scarcely exceeding .7 in. in length; common petiole .15-.25 in. long; stipules .1 in. long, lanceolate, persistent. *Leaflets* .12-.5 in. long, ovate, truncate or emarginate, with scattered adpressed hairs beneath. *Flowers* very small, white or purple, generally 1-3 together from the axil of the upper leaves; pedicels .25-.35 in. long, capillary. *Calyx* about .1 in. long; teeth long, setaceous. *Pod* about .5 by .12 in., somewhat curved, indented along the lower suture; joints 3-5, rather longer than broad, pubescent or nearly glabrous, reticulate-veined.

Common in meadows upto 5,500 ft. in the hills. An excellent fodder.

Fls. & Fr. chiefly 8-12.

**Desmodium heterophyllum DC.**

Similar to the above in habit but larger. *Leaves* 3-foliolate upto 1.5 in. in length; common petiole .35-.5 in. long, pubescent; stipules .12 in. long, caudate-acuminate, persistent. *Leaflets* obovate-oblong, .5-1 in. long, hairy beneath. *Flowers* purple, axillary, solitary or two together or in 2-6-flowered lax racemes; pedicels .5-.7 in. long; bracts lanceolate, deciduous. *Calyx* as in the last species, but teeth longer. *Pod* .5-.7 by .12-.15 in., much indented along the lower suture, glabrescent; joints 4-5, as broad as long.

Plains of both valleys and in the KHASI HILLS, usually in meadows.

Flrs. & Fr. probably at the same time as the last species.

**Desmodium oblongum Wall.**

A slender under-shrub; stem hairy. *Leaflets* oblong. *Flowers* in lax much branched, paniced racemes.

Aka Hills (15303).

**Desmodium dioicum DC.**

An undershrub (woody); stem reddish brown, glabrous. *Leaves* usually 3 foliolate, elliptic, entire, acute, coriaceous, glabrous. *Racemes* 4-6 in. long. *Pods* moniliform, 1-2 in. long, densely villous.

Aka Hills. (15307).

**13. ABRUS Linn.**

Dextrorse twining shrubs with woody stems. *Leaves* paripinnate; rachis ending in a bristle; stipules lanceolate, deciduous. *Leaflets* opposite, shortly petioluled; stipels minute, rigid, persistent. *Flowers* in fascicles in dense axillary racemes or branchlets; bracts and bracteoles small, deciduous. *Calyx* campanulate, almost truncate; the teeth being very short. *Corolla* much exserted; standard broadly ovate, narrowed down to a short claw, slightly adnate to the staminal tube. *Stamens* 9 in a sheath, the 10th absent. *Ovary* subsessile, many-ovuled; style short, incurved, not bearded; stigma capitate. *Pod* more or less compressed, thinly septate between the seeds

Leaflets not exceeding .3 in. in width; pod	
turgid, 3-5 seeded, globose or ovoid. . . . .	1. <i>A. precatorius</i> .
Leaflets up to .5 in. in width; pod flat. 6-10	
seeded; seeds compressed. . . . .	2. <i>A. pulchellus</i> .

**1. *Abrus precatorius* Linn.** Vern. *Latur-mani* or *Ratur-mani*, Ass.; *Kunch*, Beng.; *Gunja*, Hind. & Sans. Crab's eyes, Eng.

A handsome twining shrub. *Leaves* 2·3·5 in. long; stipules ·15 in. long, subulate. *Leaflets* 20-40, ·4-1 by ·2·3 in., oblong-ligulate, minutely apiculate, membranous, glabrous or thinly silky beneath; stipels minute. *Flowers* reddish or dull white, clustered on tubercles in dense pedunculate racemes, which are shorter than or sometimes as long as the leaves; peduncle often leaf-bearing; pedicels very short. *Calyx* ·1·15 in. long, truncate, thinly silky. *Corolla* ·3·5 in. long; standard ovate, acute, narrowed to a short claw, wings oblong, falcate and shorter than the arcuate keel. *Pod* 1·1·7 by ·4·5 in., 3-5 seeded, oblong, with a sharp deflexed beak, thinly pubescent, turgid but thinly septate between the seeds. *Seeds* about ·2 in. long, generally two-thirds scarlet or white and the rest jet-black, sometimes wholly white, rarely wholly black, smooth, shining.

On bushes in scrub jungles in the plains of both VALLEYS.

The roots, leaves and seeds are used medicinally. The seeds which are said to weigh constantly about 1·75 grains are used by Indian jewellers as their lowest unit of weight-rati. The seeds contain a poisonous principle known as *abrin*.

Flrs. 8-9. Fr. 12-1.

**2. *Abrus pulchellus* Wall.** Vern. *Mei-marang-theng*, Khasi (Sylhet border).

Of the same general habit as the foregoing species. *Leaves* 3·5·5 in. long. *Leaflets* 16-30, ·5-1·3 by ·25·6 in., oblong or oblong-obovate, shortly apiculate with scattered adpressed hairs beneath. *Flowers* pinkish, ·4·5 in. long, in clusters arranged on protuberances on one sided, long peduncled, terminal and axillary racemes, usually exceeding the leaves; peduncles considerably lengthening in fruit. *Calyx* about ·1 in. long, campanulate, with a wavy mouth. *Pod* 2·5·3 by ·4·5 in., compressed, adpressed hairy outside, 6-10 seeded. *Seeds* compressed, ellipsoid, about ·2 in. diam., uniformly dark-brown or black.

In about the same localities as the last species, but more common in the vicinity of hills.

Flrs. 9-10. Fr. 11-12.



**PISUM** Linn.

**Pisum arvense** Linn. Vern. *Matar*, Beng. & Hind.; *Matar-mah*, Ass.

An annual scandent herb with hollow stems. *Leaves* paripinnate, the rachis ending in a tendril, stipules auricled, often larger than the leaflets. *Leaflets* 2-3 pairs, .3-.5 in. long, obovate or elliptic, toothed. *Flowers* generally purple. *Staminal* tube truncate. *Style* firm, dilated into a sheath. *Pod* turgid, 1-1.5 in. long, 3-5 seeded. *Seeds* globose but with lateral depressions, mottled.

Cultivated as a field crop, often in combination with mustard, in the LOWER BRAHMAPUTRA VALLEY.

**Pisum sativum** Linn. Vern. *Matar*, Hind. & Beng. & Ass.—Very closely resembling the above in almost all respects excepting the colour of the flower which is always white and the size of the plant and of its pods and seeds. The pods of some varieties attain 6 in. by 1 in. and the green seeds .5 in. diam. The mature seeds are ordinarily about .4 in. diam., globose and dry, usually pale yellow.

This handsome and useful plant has begun to be cultivated in gardens in towns and their suburbs.

**14. SHUTERIA** W. & A.**Shuteria vestita** W. & A.

A wiry climber with patently hairy stem. *Leaves* 3-foliolate; common petiole 1-2 in. long, very slender, patently hairy; stipules .15-.2 in. long, oblong-lanceolate, scarious; persistent. *Leaflets* 1-2.5 by .8-1.5 in., ovate; apex obtuse and cuspidate, rounded or subcordate at the base, green and usually glabrous or nearly so above, and adpressed grey-pubescent beneath; lateral nerves 5-6 on either half, very slender; lateral petiolules .1-.15 in., stipels setaceous. *Racemes* 1-3 in. long, sessile, dense, often fascicled; patently hairy; bracts small, rigid, lanceolate, persistent; pedicels short. *Calyx-tube* deeply campanulate, gibbous, about .15 in. long, densely hairy; teeth slender, shorter than the tube. *Corolla* reddish or purplish, about .5 in. long; standard with fine purple veins, slightly exceeding the keel, not spurred; wings spurred; keel petals connate, both wings and keel tipped with purple. *Stamens* 2-adelphous. *Ovary* many-ovuled; style incurved, filiform, beardless. *Pod* 1-1.25 in. long, linear, compressed, shaggy with rusty hairs, 5-6 seeded.

KHASI HILLS, 4,5000 ft., chiefly in forest glades.

Fl. & Fr. 11-1.

Var. *glabrata* also occurs in the same localities which differs from the type by having glabrescent leaflets and calyx.

S. *hirsuta* Baker, also occurs in the KHASI HILLS. The stem is more rigid and more densely hairy with reflexed hairs, the leaves are coated with adpressed hairs on both surfaces, the racemes are peduncled and laxer flowered and the flowers are purplish.

## 15. DUMASIA DC.

Slender climbing herbs. *Leaves* pinnately 3-foliolate; leaflets with minute stipels. *Flowers* in axillary racemes; bracts small; bracteoles minute. *Calyx* tube cylindrical, gibbous, much obliquely truncate. *Corolla* yellow, exserted; standard obovate, clawed, spurred; wings and keel very long-clawed, adherent above the claws. *Stamens* 2-adelphous. *Ovary* linear; style long, flattened upwards, not bearded. *Pod* linear, falcate, torulose. *Seeds* subglobose; testa hard, blue-black.

*Leaves* long petioled; leaflets distinctly petioled, ovate; corolla twice as long as the calyx-tube.

1. *D. villosa*.

*Leaves* subsessile; leaflets subsessile, suborbicular; corolla only slightly exceeding the calyx-tube.

2. *D. cordifolia*.

### 1. *Dumasia villosa* DC.

A slender twiner with thinly hairy wiry stem. *Petiole* 1-2 in. long, very slender; stipules subulate, .15 in. long. *Leaflets* 1-5-3 by 1-2 in., ovate, obtuse, obscurely mucronate, subcuneate or rounded at the base, membranous, dark-green above, paler underneath, thinly adpressed pilose on both surfaces; lateral nerves 5-6 on either half, lowest pair from near the base and strongest petiolules about .1 in. short, very slender. *Calyx-tube* .2-.3 in. long, thinly hairy outside. *Corolla* yellow, .5-.7 in. long. *Pod* dun-velvety, 1-2 in. long, 2-4 seeded, torulose between the seeds.

KHASI HILLS, 4,600 ft., e.g., Kynshi, Mawphlang, etc., Var. *leiocarpa* with subglabrous leaflets and pods also occurs in the same localities.

Fls. & Fr. 7-10.

## 2. *Dumasia cordifolia* Benth.

Differs from the above by subsessile leaves and leaflets, the latter being cordate-orbicular much smaller and glabrous; shorter, laxer and fewer-flowered racemes, glabrous calyx and less exserted corolla.

KHASI HILLS Hk. f. & Th.

*Glycine Soja* Benth. Syn. *Glycine hispida* Maxim. Vern. *Patni-jokra*, Ass.; *U Rymbai-kutung*, Khasi. The Soy Bean.—A suberect stout annual herb, 1-2 ft. high, densely covered with patent rusty hairs. *Leaves* 3-foliolate: common petiole 2-6 in. long, hairy; stipules about .2 in. long, subulate, concealed in the hairs of stem. *Leaflets* 1-5.3-5 by 1-1.25 in., oblong-lanceolate, membranous, hairy on both surfaces; lateral nerves about 5 on either half, faint; lateral petiolules .1-1.15 in. long, densely hairy. *Racemes* axillary, sessile with few congested flowers. *Calyx* reddish, little exserted; petals subequal. *Stamens* almost completely monadelphous. *Ovary* subsessile; style short, incurved, beardless. *Pod* 1-1.5 in. by .3-3.35 in., flattish, recurved, narrowed towards the base, densely hairy, 1-3 seeded. *Seeds* brown, ellipsoid, compressed, .3-4 in. long, with a long hilum.

Cultivated as a field crop in the KHASI HILLS for the seeds which are used as a pulse and as fodder for cattle.

Fls. 9-10. Fr. 11-1.

## 16. TERAMNUS Sw.

*Teramnus flexilis* Benth. Vern. *Nongsangpher*, Mik.

A twining herb with terete, sparingly adpressed hairy, green stems. *Leaves* pinnately 3-foliolate; common petiole 4-5 in. long, slender, channelled; stipules obliquely lanceolate. *Leaflets* 4-5 by 2-2.5 in., ovate or ovate-oblong, acuminate, rounded at the base, membranous, dark-green above, paler beneath, more or less adpressed hairy on both surfaces; lateral nerves 5 or 6 on either half; lateral petiolules about .15 in. long, covered with bristles; stipels minute, setaceous or subulate. *Racemes* axillary, up to 1 in. long, shaggy with white bristles, the flowers crowded at the extremity. *Calyx-tube* about .12 in. long, campanulate, hairy outside; teeth deltoid, sub-equal. *Corolla* reddish, slightly exserted; petals nearly all equal; standard not spurred. *Stamens* monadelphous, alternate stamens sterile. *Ovary* sessile, many ovuled; style short, beardless. *Pod* 2.5-3 by .2 in., straight, flat, sparingly adpressed hairy, 8-10 seeded, septate between the seeds.

Fairly common in forest glades and on fallow lands in the plains and upto 2,000 ft. in the hills.

Flrs. 9-10. Fr. 11-12.

### 17. MUCUNA Adans.

Perennial or annual climbing herbs or shrubs. *Leaves* large, pinnately 3-foliolate, minutely stipellate. *Flowers* large, usually dark-purple, generally fascicled on the tumid nodes of the axillary or lateral racemes which are sometimes corymbose. *Galyx* campanulate, the two upper teeth connate. *Corolla* much exserted; keel rostrate, much exceeding the standard and generally slightly exceeding the wings. *Stamens* 2-adelphous; anthers 2-morphous, alternately basi-fixed and dorsifixed. *Ovary* sessile, many-ovuled; style incurved, beardless. *Pod* hard, usually covered with irritating bristles.

- I. Pod obliquely plaited on the faces :—
  - Pod winged, 2-4 seeded. . . . . 1. *M. imbricata*.
  - Pod not winged, 1-seeded. . . . . 2. *M. monosperma*.
- II. Pod not plaited, nor winged :—
  - A. Pod 12-18 in. long, 8-12 seeded. Leaves glabrous. . . . . 3. *M. macrocarpa*.
  - B. Pod not exceeding 4 in. in length, 5-6 seeded :—
    - Pod without longitudinal furrows.
    - Peduncles conspicuously bracteate.
    - Leaves adpressed hairy. . . . . 4. *M. bracteata*.
    - Pod longitudinally furrowed. Bracts small. Leaves grey-silky beneath. . . . . 5. *M. prurita*.

1. *Mucuna imbricata* DC. Vern. *Mekuri-ghila*, Ass.; *Tapo-tapi-rubi*, Abor; *Suthai-makhra*, Kach.

A large climber with slender glabrescent branches. *Common petiole* 3-5 in. long, slender. *Leaflets* 4-6 in. long, lanceolate, ovate lanceolate or elliptic, more or less acuminate, membranous, glabrous above, sparsely yellow hairy beneath; petiolules stout, .25 in. long. *Racemes* 4-12 in. long, pendulous, long peduncled, laxly 8-10 flowered; bracts large, caducous; pedicels .5 in. long. *Calyx* .7 in. long with a few irritating bristles; teeth nearly as long as the tube. *Corolla* 2.2-2.5 in. long, dull purple; keel abruptly reflexed at the tip; standard 1 in. broad. *Pod* 4-6 by 2 in., oblong, 2-4 seeded, with two wings on each suture about .5 in. broad,

and with close oblique plaits on the faces, densely covered with brittle ferruginous bristles. *Seeds* large, flat.

UPPER ASSAM, not very common. Nizamghat in the N. E. FRONTIER DISTRICT to the Dhansiri Reserve, NOWGONG.

Flrs. Rainy season. Fr. 12-4.

**2. *Mucuna monosperma* DC.** Vern. *Mei-sia-ryntim*, Khasi.

A large woody climber; branches longitudinally ribbed; branchlets slender, glabrescent. *Common petiole* 2-4 in. long, slender, generally red, ferruginous-pubescent; stipules caducous. *Leaflets* 3-5 by 2-3.5 in., ovate-oblong, the lateral very oblique, abruptly acuminate, quite entire, chartaceous, glabrous above, covered when young with ferruginous pubescence underneath; midrib and lateral nerves generally red, the latter 5 or 6 on either half, slender, much arched, ultimate nervules very closely and finely reticulate; petiolules .25-.3 in. long, stout, terrete, pubescent. *Racemes* axillary or from old nodes, 2-4 in. long, subcorymbosely 6-12 flowered, short peduncled; rachis coloured or zigzag, velvety, sometimes reduced to tendrils; pedicels .5-.8 in. long, velvety. *Calyx* bowl-shaped, .5-.6 in. across, with scattered bristle-like reddish hairs both inside and outside, hispidly velvety outside; lobes short. *Flowers* about 2 in. long; standard .7-1 by .5-.7 in., suborbicular, dull purple; wings 1.2-1.5 by .3-.35 in., oblong, conforming to the keel, dull purple; keel slightly longer but narrower than the wings, greenish; standard outside, wings and keel towards the base with scattered reddish brown bristles. *Pod* about 2 by 1.3 in., ovate-ovoid, 1-seeded, densely covered with reddish or dark-brown irritating bristles, which on young pods completely conceal the plaits on the faces.

Along the southern foot of the KHASI HILLS between Shella and Nongkla, generally in swampy localities.

Flrs. 11-12. Fr. 12-2.

**3. *Mucuna macrocarpa* Wall.** Vern. *Mei*-, *Jermi*- or *Thar-jendru*,—*jenreu* or —*jirnriu*, Khasi; *Dushmai-doukha*, Kach.

A very large woody climber with whitish lenticellate

bark exuding sticky watery gum from cuts; branches obscurely sulcate, at first adpressedly grey-pubescent, glabrescent with age. *Common petiole* 2-6 in. long, slender. *Leaflets* 3-7 by 2-5 in., elliptic-ovate, lateral oblique, abruptly acuminate, coriaceous, adpressed grey-hairy on both surfaces when young, soon glabrescent above and nearly so beneath; lateral nerves about 5 on either side of the midrib, prominent beneath, arched; petiolules .3-.4 in. long, brown-tomentose. *Racemes* axillary and generally solitary on short branches, but more generally in fascicles from the old wood, often branched above the short peduncle; rachis densely grey-velvety; bracteoles .5-.7 in. long, ovate-oblong, velvety. *Calyx* about 1 in. long, somewhat gibbous, dark-green, with deciduous irritating bristles; lobes short, unequal. *Corolla* 2-3 in. long; petals covered outside with similar deciduous bristles as the calyx; standard 1.2-1.5 in. broad, greenish; wings 1.7-2 by .6-.7 in., fleshy, purple; keel 1.7-2.5 in. long, abruptly turned up and gradually narrowed to the tip. *Style* glabrous. *Pod* 12-18 by 1.5-2 in., on a stipe, 1.5-2.5 in. long, laterally compressed, 8-12 seeded, constricted between the seeds, channelled along the suture, velvety when young. Seeds 1.2 by 1 in., rhomboid or ellipsoid; testa dark-brown, horny, glabrous and shining outside; hilum round three quarters of the edge (giving the seed the appearance of a leather purse).

NORTH CACHAR and KHASI HILLS upto 4500 ft., also in the neighbourhood of Dulong-mukh, NORTH LAKHIMPUR (not very common).

Fls. 3-4. Fr. 9-11., but apparently remaining long on the plant after maturing.

#### 4. *Mucuna bracteata* DC. Vern. *Wakmi*, Garo.

An annual or perennial climber; branchlets at first adpressed grey pubescent, glabrescent. *Common petiole* 4-5 in. long, slender, nearly glabrous. *Leaflets* 2.5-4 by 1.7-3.5 in., terminal rhomboid, lateral deltoidly oblique, acute or subacute, membranous or chartaceous, dark-green and glabrescent above, finely adpressed pubescent beneath; lateral nerves 6-7 on either side of the midrib; lateral petiolules .15-.2 in. long, hairy; stipels subsistent, about

·15 in. long, setaceous. *Racemes* axillary, 6-10 in. long, bracteate down to the base; rachis softly pubescent; bracts ·5-·6 in. long, ovate or obovate, tip usually pointed, pubescent and also with scattered bristles. *Flowers* about 1·5 in. long, blackish-purple. *Calyx* ·4-·5 in. long; teeth linear, covered with grey tomentum and scattered bristly hairs; standard broad, wings falcate, much longer than the standard, ciliate along the base on the outer margin; keel exceeding the wings. *Pod* 3-4 in. long, 5-6 seeded, almost terete, when fully mature, serpentine curved, covered with reddish bristles, not longitudinally ribbed.

UPPER ASSAM, generally in glades in evergreen forests, also in the GARO and KHASI HILLS, upto 3,000 ft., not very common.

The seeds and the hairs of the pod have probably the same economic uses as those of the next species *M. prurita*.

Flrs. 1-2. Fl. 3-5.

***Mucuna exserta*** C. B. Clarke Ms. ex. C. E. C. Fisher.

A perennial or annual climber; branchlets striate; common petiole glabrescent, striate, 1-2·7·8 in. long. *Leaflets* rigid, 2·7 by 1-2·4·5 in., terminal rhomboid; lateral obliquely ovate, broader half outwards, acute or acuminate, margins subundulate, glabrous or nearly above, adpressed brownish pubescent beneath; main lateral nerves 5-6 on either half, ultimate reticulations fine; petiolules ·15-·2 in. long. *Racemes* terminal, upto 9·5 in. long, densely clothed with soft brown pubescence mixed with stiff, red irritating bristly hairs. *Bracts* upto ·8 in. long, those at the base of the raceme more or less persistent. *Flowers* about 1·5 in. long; pedicels ·2-·5 in. long. *Calyx* about ·4 in. long, thinly pubescent and bearing rufous bristly hairs. *Corolla* deep purple, about ·8 in. long, wing narrow oblong, lower half brown hairy, about 1·2 in. long; keel exceeding the wings and recurved at the apex. *Stamens* as long as the keel. *Pod* 2-3 in. long, linear-oblong; apex rounded, turgid, densely covered with dark brown bristles.

KHASI HILLS (1500 ft. C. B. Clarke. ASSAM—Griffith); MANIPUR—Neechugard.

Flrs. 2.

Closely allied to *M. bracteata* DC. differing by its rigid leaflets, more finely reticulate tertiary nerves and by its flowers and pods being more densely clothed with brown bristles.

**5. *Mucuna prurita*** Hk. Vern. *Akolshi*, Beng. The Cowitch or Cowage plant.

A twining annual very similar in appearance to the above. *Common petiole* 4-7 in. long. *Leaflets* 3-8 in. long,

ovate or rhomboid, glabrescent above, adpressedly grey-silky beneath. *Racemes* 4-8 in. long, short-peduncled, drooping, 10-20 flowered. *Calyx* .25-.4 in. long, 2-lipped with irritating bristles. *Corolla* 1.3-1.6 in. long, dark-purple; wings about .25 in. broad, shorter than the incurved keel. *Pod* 2-3 by .6-.8 in., 5-6 seeded, almost terete, ends curved in opposite directions, longitudinally ribbed, covered with dense pale-brown bristles.

Generally in scrub forests and waste land, in the plain.

The seeds are used as an aphrodisiac and the irritating hairs as a vermifuge.

Flrs. 1-3. Fr. 4-6.

### 18. ERYTHRINA Linn.

Generally trees with prickly branches. *Leaves* pinnately 3-foliolate; common petioles sometimes prickly; stipels gland-like. *Flowers* large, usually bright red, in long peduncled axillary or terminal racemes. *Calyx* oblique at the mouth, spathaceous or campanulate and 2-labiate. *Corolla* much exserted; petals very unequal, the standard much exceeding the wings and the keel. *Stamens* 10, the upper stamen free or nearly so, other stamens free above, alternately long and short. *Ovary* stalked, many-ovuled; style incurved, not bearded. *Pod* linear, turgid, septate between the seeds, more or less torulose. *Seeds* ovoid-oblong without a strophiole.

- I. *Calyx* spathaceous, entire. *Pod* 2-3 seeded, scarcely torulose. Leaflets nearly as broad as long. . . . . 1. *E. stricta*.
- II. *Calyx* campanulate and 2 labiate:—
  - Standard as broad as long. *Pod* 6-8 seeded, distinctly torulose. Leaflets ovate-oblong. . . . . 2. *E. ovalifolia*.
  - Standard much longer than broad. *Pod* 4-6 seeded, flat and broad. Leaflets at least as broad as long. . . . . 3. *E. arborescens*.

1. **Erythrina stricta** Roxb. Vern. *Madar* or *Mandar*, Beng. & Ass.; *Tagat-asing*, Miri & Abor; *Pharse* or *Pharche-arong*, Mik.; *Bol-Madal* or *Mandal*, Garo; *Antu*, *Bag-long-thing*, *Kuong-cho-thing*, Kuki; *Mander-phang*, Cach.; *Dieng-song* or *R'song*, *Dieng-song'-dkhar*, Khasi; *Phartu*, Lush.; *Kung-choh*. Tipp.; *Phalita*. *Phalidha*, Nep.



A fairly large tree with a striking appearance when in flower. *Bark* deeply furrowed, greenish-yellow outside, often with strong prickles, inside white or dun-brown with white streaks; branchlets stout, glabrous, with many slightly incurved prickles; pith large, shoots pubescent when young. *Common petiole* 6-9 in. long, terete, not armed; stipules falcate. *Leaflets* 5-7 in. across, sometimes broader than long, rhomboid-orbicular or ovate, lateral oblique, all shortly acuminate, rather membranous, glabrous and shining above, glaucous and minutely pubescent along the nerves beneath; lateral nerves 6-8 on either half, the lowest basal, slightly arched, tertiary nerves rather irregular, transverse to the secondary with very fine reticulations between; base very broadly cuneate; lateral petiolules .35-.5 in. long, thicker than the petiole. *Racemes* 6-9 in. long, horizontal, secund, crowded at the ends of branchlets, pubescent when young; peduncles 5-7 in. long and .2 in. thick at the base; bracts caducous, up to 2 in. long, linear or subulate, brown pubescent. *Flowers* coral-red. *Calyx* spathaceous, about .5 in. long, pubescent in bud; standard scarlet, 1.5-2 in. by 1 in., ovate or obovate with parallel white lines inside; keel .7-.9 in. long, scarious, light greenish; wings minute, truncate, reddish. *Pod* 4-5 in. long, obscurely torulose, spindle-shaped, sharply pointed, glabrous outside, white silky inside. *Seeds* 2-3, kidney-shaped, red.

Fairly common throughout the province ascending to 3,500 ft. in the Hills.

Wood white, soft, very light, weighing about 16 lbs. per c. ft. It can however be used as planks, specially in carriage building.

Fls. 1-3. Fr. 3-5.

**2. *Erythrina ovalifolia* Roxb. Vern. *Hari-kekra*, Beng.**

A small tree. *Branches* pale-grey, armed with numerous black prickles; bark thick, deeply cracked. *Common petiole* 2-4 in. long, terete, sometimes armed. *Leaflets* 3-9 by 1.5-5 in., ovate-oblong, subcoriaceous, glabrous above, glaucous beneath; lateral nerves 6-8 on either half, tertiaries indistinct; base broadly cuneate; lateral petiolules 1.5-1.7 in. long. *Racemes* terminal, 4-6 in. long, horizontal. *Flowers* scarlet,

1.5-1.7 in. long, mostly in groups of three on the rachis. *Calyx-tube* about .5 in. long, turbinate, bursting irregularly, brown-tomentose outside. *Standard* 1.5-2 by 1.5 in., obcordate, erect; keel .7-1 in. long; wings still shorter with coloured tips. *Pod* 3.5 in. long, 6-8 seeded, constricted between the seeds along the upper suture; seeds black, kidney-shaped, about .5 by .25 in.

Said to occur in SYLHET and ASSAM PROPER.

Fls. 1-3. Fr. 4-6.

**Erythrina arborescens** Roxb. Vern. *Dieng-son*. *Dieng-song*, *Dieng-ja-ra-song*, *Dieng-r-song-hadem*. Synt.; *Dieng-song*, Khasi.

A small tree with a low spreading crown. *Bark* rough, with a shining layer of cork outside, bright-green underneath the cork, inside pale white. *Common petiole* 8-10 in. long, stout, terete, glabrous. *Leaflets* 5-7 in. long and as broad and often broader, broadly triangular-ovoid or rhomboid with a cuneate base, sharply acuminate, membranous, bright green shining and quite glabrous above, subglaucous and slightly hispidulous along the nerves beneath; lateral nerves 5-7 on either half, nearly straight, tertiaries transverse to the secondaries, reticulations very fine; lateral petiolules about .5 in. long, stout. *Racemes* axillary, 8-10 in. long, long-peduncled, pubescent when young; pedicels slender up to .2 in. long. *Calyx* silky or nearly glabrate outside. *Standard* orange-red, 1.5 by 1 in., elliptic, concave, emarginate, veined, velvety inside; wings pale-green, lineate, .5 in. long, ovate; keel triangular ovate, acuminate, .7 in. long, pale-green. *Pod* much curved, 6-9 by 1 in., narrowed at both ends, 4-6 seeded. *Seeds* about .5 in. long, oblong-reniform, white (at least when not fully ripe); testa smooth.

KHASI HILLS 4,500-6,000 ft., often planted.

Wood as of *E. stricta*.

Fls. 8-9. Fr. 10-11.

## 19. BUTEA Roxb.

Trees or shrubs, the latter erect or climbing. *Leaves* pinnately 3-foliolate (very rarely 1-foliolate in *B. frondosa*);

stipules small, caducous. *Leaflets* large; stipels tribulate. *Flowers* large, showy, fascicled in axillary or terminal, simple or compound racemes; bracts and bracteoles small, caducous. *Calyx* campanulate; teeth deltoid, the two upper connate. *Corolla* much exerted; petals subequal or unequal, generally orange-red; standard ovate or lanceolate, recurved; wings falcate, adnate to the keel. *Stamens* diadelphous, anthers uniform. *Ovary* sessile or shortly stalked, 2-ovuled; style filiform, curved, beardless. *Pod* oblong, flat, with only one seed at the apex and dehiscent only above the seed. *Seed* obovate, compressed; hilum small.

- I. Flowers at least 2 in. long, keel much incurved acute. Pod stalked.—  
     A middle-sized tree. Lower calyx-teeth deltoid, pod grey-tomentose. . . . . 1. *B. frondosa*.  
     A large climber. Lower calyx-teeth lanceolate; pod rusty-tomentose. . . . . 2. *B. superba*.  
 II. Flowers about 1 in. long; keel slightly curved obtuse. A sub-erect shrub. Pod sessile. . . . . 3. *B. minor*.

**1. *Butea frondosa*** Roxb. Vern. *Polah*, *Polak*, Ass.; *Palas*, Beng.; *Bol-ori*, or *-uri*, *Bol-aphal-uri*, Garo; *Dhak*, Hind.; *Kinsuka*, *Palasa*, Sans Flame of the forest.

A tree up to 50 ft. in height and 6 ft. in girth; young parts softly silky, often gnarled; bark rough, bluish-grey or dark-brown outside, fibrous and light red inside, exuding from wounds a light red gum which dries to ruby-coloured beads. *Common petiole* 5-9 in. long; stipules short, tomentose. *Leaflets* 5-8 by 4-5-7 in., hard, rigidly coriaceous, glabrescent and somewhat shining above, silky tomentose beneath, lateral obliquely ovate or broad elliptic; terminal rhomboid or broadly obovate from a cuneate base; lateral nerves 4-7 on either half, slightly arched, very prominent beneath, petiolules .2-.4 in. long, stout. *Racemes* axillary, crowded towards the extremities of leafless branchlets, 4-6 in. long, rigid, often subcorymbose; pedicels .5-1.3 in. long, the stout rachis and bracts and calyx covered with dark chocolate or brown velvety tomentum. *Calyx* .5 in. long, cup-shaped, fleshy, grey-silky inside. *Petals* bright orange-red, equal, silvery tomentose outside; standard 1 in. broad,

recurved; keel incurved, beaked; wings falcate, adhering to the keel. *Ovary* shortly stalked. *Pod* 4-6 by 1·2-1·7 in., ligulate, firm, pendulous, silky tomentose, more densely so along the sutures, abruptly narrowed to a stalk, ·5-·7 in. long. *Seed* 1·2-1·5 in. long, oval, compressed, dark-brown.

Plains of Assam up to SIBSAGAR, generally in water-logged localities, —not reported from LAKHIMPUR. Also in the GARO HILLS up to 1,000 ft.

The wood is dirty white, porous, soft, weighing 36 lbs. per c. ft. It is durable under water and is used for well-curbs and piles. The red juice which hardens into a ruby coloured gum is used as a substitute for Kino. The flowers give an orange dye and a decoction of them is used to keep out white ants from fields. The seeds have a medicinal use. Lac is often grown on the branches. The leaves are used as plates like those of *Sal*, and to wrap up grocers parcels. They are also lopped for buffalo fodder.

Leafless 2-3. Flrs. 3-4. New leaves 4. Fr. 6-7.

## 2. *Butea superba* Roxb. Vern. *Lata-palash*, Beng.

A large woody dextrorse climber with fairly smooth brownish bark, exuding a red juice like the preceding species and closely resembling it in foliage and flowers. *Leaflets* usually much larger, sometimes attaining over 18 in. in young plants, the racemes much longer, thinner and more flexuous and the flowers larger and of a brighter yellow but with a smaller calyx than in *B. frondosa*. *Pod* somewhat shorter, but longer stalked, not so broad, somewhat rigid, densely rusty tomentose.

Only found in the drier parts of *Sal* areas in GOALPARA.

The gum, the leaves and the flowers can respectively be put to the same uses as those of *B. frondosa*.

Flrs. 3-4. Fr. 4-6.

## 3. *Butea minor* Ham. Vern. *Dieng-la-palang*, Khasi and Synt.

An erect shrub with long switchy branches covered with grey-silky tomentum. *Common petiole* 4-8 in. long, channelled, tomentose; stipules about 1 in. broad, semicircular, often persistent. *Leaflets* often up to 15 by 12 in., more or less of the same shape as, but somewhat less coriaceous than of the other two species, glabrate above, bright grey-silky beneath; lateral nerves 7-9 on either half, very oblique. *Racemes*

4-12 in. long, erect, angular, often with short branches at the base; pedicels .5-.7 in. long, terete, tomentose. *Flowers* .8-1 in. long, red. *Calyx* about .3 in. long, silky tomentose; teeth short, acute. *Corolla* densely velvety; standard .5 in. broad; wings .5-.6 in. long, very slightly falcate, shorter than the slightly inflexed keel. *Style* hairy. *Pod* 3-3.5 in. long, rigid, sessile, cuneate at the base, rusty-tomentose.

KHASI HILLS, 3-5,000 ft. in open grass-lands, specially in the Jowai Sub-division where the leaves are used for wrapping parcels

Fhs. 8-10. Fr. 10-12.

## 20. SPATHOLOBUS Hassk.

**Spatholobus Roxburghii** Benth. Syn. *Butea parviflora* Roxb. Vern. *Sallata*, Hallot, *Mal-leo*, Maru or *Mari-lewa*, *Panlota*, *Hati-bandhalata*, Ass. (Kam.); *Gobang-lata*, Ass. (Darrang); *Salmama*, Beng & Mech.; *Jermei* or *Ther-la-moh-dak*, Khasi; *Mari*, *Maru*, *Mauri*, Garo; *Dumori* or *Dumri-doukha*, *Tou-mudru*, *Salmama*, Cach.; *Chichipia-ringkhong*, Mikir; *Jong-obi*, Tipp.; *Ngoi-hrui*, Lush.; *Maloi-lewa*, Jharua, *Debre-lawa*, Nep.; *Jema-soi-sen*, Kuki.

A large sinistrorse evergreen climber; stem with concentric layers of bast inside which exude a red gum when cut; branches grey-pubescent. *Leaves* pinnately trifoliate, stipellate. *Common petiole* 3-4 in. long, terete or only slightly channelled above, glabrescent; stipules deciduous, triangular-acute, .3 in. long. *Leaflets* 4-9 by 3-6 in., ovate to rhomboid or obovate, lateral very oblique, shortly acuminate, acute or obtuse, subcoriaceous, glabrous above, more or less pubescent beneath; lateral nerves 7-10 on either half, slightly arched, uppermost meeting near the margin in loops; tertiaries transverse and parallel; petiolules .2-.3 in. long; stipels setaceous. *Racemes* compound, forming large terminal panicles, 2-3 ft. long, lower portion often leafy. *Flowers* white, cream-coloured or reddish, .3-.4 in. long, solitary or in fascicles of 2-3; pedicels very short; bracts minute, linear, caducous. *Calyx* campanulate, grey-velvety; teeth acute, the two upper connate. *Petals* subequal; standard longer than the keel, emarginate; wings free; keel obtuse, nearly straight. *Stamens* 2-adelphous. *Ovary* shortly stalked, 2-ovuled; style

incurved, beardless; stigma capitate. *Pod* 3-6 by  $\cdot 6\text{--}1\cdot 6$  in., 1-seeded, generally more or less constricted and flat below the seed, narrowed at the base into a stalk,  $\cdot 4\text{--}6$  in. long, softly brown-velvety, dehiscent from the apex only sufficiently to set free the seed.

Except above a line drawn across the Brahmaputra Valley through Dhansirimukh common throughout the PROVINCE, generally in deciduous types of forest. Always present with Sal to which it does considerable harm by bending and distorting its stem round which it twines with a very tight grip.

Dry stems are often used as tinder.

Fls. 8-12. Fr. 1-3.

## 21. MASTERSIA Benth.

**Mastersia assamica** Benth. Syn. *M. cleistocarpa* Baker.  
Vern. *Tille-iyru*. Synt.

A stout woody climber; branches sarmentose, terete, glabrous, lenticelled, twining anti-clockwise. *Leaves* pinnately 3-foliate; *common petiole*  $3\cdot 5\text{--}5$  in. long; stipules broader at the base than long. *Leaflets* 4-6 by 3-4 in., ovate or obovate, tapering acuminate, the lateral oblique, chartaceous, glabrous above, minutely adpressed pubescent beneath; lateral nerves 9-10 on either half, oblique, slightly arched, tertiary subparallel, transverse to the secondaries; base rounded or subcordate; stipels about  $\cdot 25$  in. long, subulate. *Racemes* generally terminal and panicle, 12-18 in. long; nodes tumid; flowers germinate, conspicuously bracteolate. *Calyx-tube*  $\cdot 5$  in. long, turbinate; teeth long, the two upper connate. *Corolla* bluish-white, only slightly exserted; standard suborbicular; keel obtuse, almost straight. *Stamens* 2-adelphous. *Ovary* sessile, many-ovuled; style short, filiform, incurved. *Pod* 3-5 by  $1\cdot 1\text{--}25$  in., very flat, strap-shaped, septate between the seeds, the dorsal suture bordered by an erect sharp wing,  $\cdot 1\cdot 15$  in. broad, indehiscent or tardily dehiscent. *Seeds* oblong, 15-20 or more, black, shining,  $\cdot 15\text{--}2$  by  $\cdot 1$  in. on long filiform funicles.

Evergreen forests in UPPER ASSAM, e.g., Kalioni in SIBSAGAR, Dulong Valley, N. Lakhimpur, etc., also in the KHASI HILLS, 4,500 ft. and in the Borail Reserve, NORTH CACHAR HILLS.

Fls. 10-11. Fr. 12-1.

## 22. CANAVALIA DC.

**Canavalia ensiformis** DC. Vern. *Kamtal-urahi*, Ass.: *Makhan-sim*, Beng.; *Naga-thepak-rikang*, *Thepa*, Mik.; *Inam-athepa-arong*, Mik. (Barnihat); *Heppua-teipi*, Naga. The Sword Bean.

A fairly large perennial climber; branchlets glabrous, twining from right to left. *Leaves* pinnately 3-foliolate; common petiole 3·5-5·5 in. long, shallowly channelled; base swollen; stipules minute, deciduous. *Leaflets* 4-7 by 3·5-5 in., ovate to rhomboid-elliptic, terminal usually largest, lateral somewhat oblique, acute or shortly acuminate, minutely cuspidate, broadly cuneate at the base, membranous, glabrous but more or less scaberulous, specially on the upper surface; lateral nerves 6 or 7 on either half, slender, arched; petiolules 25-4 in.; stipels setaceous. *Racemes* axillary, 5-6 in. long on stout terete peduncles, 6-8 in. long; nodes tumid, thinly pubescent. *Flowers* large, white, usually with a dash of pink or purple, solitary or in pairs; pedicels short, reflexed, woody in fruit. *Calyx* 5-6 in. long, 2-lipped, upper lip notched, lower 3-lobed, sparsely adpressed pubescent to glabrescent outside, silky, specially at the throat inside; lobes much shorter than the tube, upper largest. *Corolla* 1·2-2 in. long, exserted; petals all clawed and auricled at the base; standard suborbicular, rather broader than long, slightly exceeding the wings and the keel often with two ridge-like callosities above the auricles; keel incurved, obtuse. *Stamens* monadelphous. *Ovary* silky, many-ovuled; style incurved, beardless; ovules 10 or more. *Pod* 8-10 by 1·3-1 in. (in cultivation much longer), flat but with two prominent longitudinal ridges along the upper suture, with a slight serpentine curvature along its vertical plane. *Seeds* 6-10, about 1 in. diam., compressed, pink or white when fully ripe.

UPPER ASSAM, SIBSAGAR, Silghat, etc., cultivated in SYLHET. The tender pods are used as a vegetable and the seeds as a pulse.

Flrs. & Fr. 8-12.

**Var. *virosa*** Vern. *Kathsim*, Beng., differs by its smaller leaves which are more persistently hairy on the undersurface, hairy petioles, smaller lilac flowers borne on denser and shorter racemes and much smaller pods (3-6 in. long) and less compressed marbled seeds. The pods are not edible and the seeds are said to be poisonous.

## 23. DIOCLEA H. B. K.

**Dioclea javanica** Benth. Syn. *D. reflexa* Hk. f.

A slender woody climber; branchlets terete, pubescent when young. *Leaves* pinnately 3-foliolate. *Leaflets* 3-4 by 1·5-3 in., ovate or elliptic, acute or shortly acuminate, entire, coriaceous, thinly adpressed hairy above, more densely and more softly hairy beneath; lateral nerves 8-10 on either side of the midrib, arched, prominent beneath; base rounded; lateral petiolules ·15-·2 in. long, stipellate. *Racemes* 12-18 in. long, long-peduncled, subspicate, thickened at the nodes; bracts ·5 in. long, linear, reflexed, silky, caducous. *Clayx-tube* ·3-·5 in. long, bracteolate, trubinate; teeth as long as the tube. *Corolla* ·7-·9 in. long, bluish-white or reddish; standard orbicular or ovate, reflexed, auricled at the base; keel free, incurved, not beaked. *Stamens* 10, monadelphous, the uppermost free at the base. *Ovary* subsessile, 2-3 ovuled; style incurved, beardless. *Pod* 3-4 by 2 in., half-moon-shaped, 2-seeded, wrinkled outside over the seeds, not septate, covered with short brown hairs; lower suture sharp, upper about ·5 in. broad. *Seeds* somewhat compressed.

Forests of SYLHET, Hk. f. & Th.

Flrs. 12-1. Fr. 2-3.

## 24. PUERARIA DC.

Twining or diffuse shrubs or herbs. *Leaves* pinnately 3-foliolate; stipules herbaceous, sometimes fixed by the centre; leaflets sometimes palmately lobed; stipels subulate. *Racemes* long usually, axillary when simple and terminal when compound. *Flowers* bluish to reddish, generally ternate on the node of the rachis; bracts and bracteoles small, caducous. *Calyx* campanulate; teeth long or short, the two upper connate. *Corolla* exserted; petals subequal; standard usually spurred at the base; wings narrow, often falcate, adnate to the straight or incurved keel. *Stamens* 10, monadelphous, the odd filament being usually coherent with others at the middle to form a tube, rarely 2-adelphous; anthers uniform. *Ovary* sessile or shortly stalked, many-ovuled; style long, filiform, much incurved, beardless; stigma globose. *Pod* linear, flattish, glabrous or hairy. *Seeds* transversely oblong.



- I. Flowers bluish appearing before the leaves.  
Pod flat, membranous, constricted between the seeds :—  
 Leaflets not lobed; pod bristly; climbing shrub. . . . . 1. *P. tuberosa*.
- II. Flowers reddish or red-tipped, appearing with the leaves. Pod not constricted between the seeds :—
  - A. Leaflets not lobed :—
    1. Pods glabrous. Stipules basifixed :—  
 Pod membranous, flexible. Pedicels longer than calyx; herbaceous climber. . . . . 2. *P. peduncularis*.  
 Pod coriaceous, rigid. Pedicels not exceeding the calyx. Subscandent shrub. . . . . 3. *P. Wallichii*.
    2. Pod shaggy. Stipules fixed by the midrib. Climbing shrub. . . . . 4. *P. Thunbergiana*.
  - B. Leaflets more or less lobed :—  
 Stipules basifixed. Pods glabrescent, rigid. Climbing annuals :—  
 Leaflets shallow-lobed. Flowers .5-.75 in. long. Pod cylindrical with unthickened sutures. . . . . 5. *P. phaseoloides*.  
 Leaflets deeply lobed. Flowers 1 in. long. Pod broader than thick, with thickened sutures. . . . . 6. *P. subspicata*.

### 1. *Pueraria tuberosa* DC.

A large woody climber with very large tuberous roots\*, flowering when leafless; old stem with grey fibrous bark; branchlets grey velvety. *Common petiole* 5-8 in. long; stipules minute, cordate-ovate, deciduous. *Leaflets* 4-8 by 3-6 in., terminal broad-ovate or rhomboid, lateral oblique-ovate, all acuminate, membranous, silky-pubescent when young, glabrescent above and thinly adpressed pubescent beneath when mature; main lateral nerves 6-8 on either half; the basal pair being opposite and stronger than the others; base truncate or obtusely cuneate, 3-5 nerved; lateral petiolules .2-.3 in. long; stipels .2-.3 in. long, lanceolate-subulate. *Racemes* erect, usually paniced and terminal or from axils of fallen leaves, 6-15 in. long,

\* Sometimes attaining 1-2 ft. in length and 10-12 in. in diameter, and often several strings of tubers connected by thin roots are developed from the same plant.

grey or brown pubescent; bracts minute. *Calyx* about  $\cdot 2\cdot 3$  in. long, densely grey-silky; teeth triangular, shorter than the tube, ciliate on the margins. *Corolla* bright-blue, fading to bluish purple,  $\cdot 4\cdot 5$  in. long; standard often light in colour with a pale yellow central spot, orbicular, emarginate, clawed, generally spurred; wings oblong-falcate, minutely spurred above the base; keel obtuse, nearly straight. *Stamens* usually 2-adelphous. *Pod* 2-3 in. long, flat, flexible, 3-6 seeded, constricted between the seeds with long bristle-like brown silky hairs.

Not uncommon in deciduous scrubs where the rainfall is not above 50 in. e.g. Upper reaches of the Nambor Valley and SUB-HIMALAYAN TRACTS in KAMRUP and E. GOALPARA.

The tubers have a liquorice like taste and are eaten raw, also used in medicine.

Leafless 12-5. Flrs. 3-4. Fr. 5-6 to 11-12 (?).

## 2. *Pueraria peduncularis* Grah. Vern. *Ting-khla*. Khasi.

An extensive twining herb; branchlets thin, clothed with short, weak, deflexed grey hairs. *Common petiole* 2-4-5 in. long, clothed like the branchlets; stipules basifixed,  $\cdot 25$  in. long, lanceolate, shaggy. *Leaflets* 4-6 by 3-5 in. ovate, ovate-rhomboid, lateral oblique, membranous, green and sub-scabrous above, grey and softly pubescent beneath; petiolules short, hairy; stipels subulate. *Racemes* 6-12 in. long, slender, rachis downy, unbranched; peduncle 2-5 in. long; pedicels filiform,  $\cdot 1\cdot 25$  in. long, fascicled; bracts subulate, adpressed silky, shorter than the pedicels. *Calyx*  $\cdot 12\cdot 2$  in. long, slightly gibbous, densely hairy outside. *Corolla*  $\cdot 5$  in. long, red or purple tipped; standard not spurred. *Upper stamen* usually free. *Pod* 2-3 by  $\cdot 25$  in., membranous, glabrous, 4-8 seeded.

KHASI HILLS, e.g., the Kyllong Rock and such other places.

Flrs. 9-10. Fr. cold season.

## 3. *Pueraria Wallichii* DC. Vern. *Mei-soh-ktaw*. Khasi.

A semi-scandent shrub with glabrous terete branches. *Common petiole* 3-4 in. long, slender, glabrous or glabrate; stipules basifixed. *Leaflets* 2-5-6 by 1-5-3-5 in., lateral

obliquely ovate, terminal elliptic or subrhomboid, acuminate, membranous, glabrescent but more or less scabrous and green, sparsely adpressed pubescent and pale beneath; lateral nerves 6-8, arcuate, lowest pair basal, tertiaries subparallel; petiolules  $\cdot 2\cdot 25$  in. long, pubescent. *Racemes* 4-8 in. long, short-peduncled, dense flowered, puberulous or glabrate; bracts subulate,  $\cdot 25$  in. long; pedicels  $\cdot 06\cdot 1$  in. long, fascicled, minutely bracteolate near the upper extremity. *Calyx*  $\cdot 15$  in. long, slightly gibbous, shallowly toothed, thinly pubescent. *Corolla* pink or brick-red or white tipped with red,  $\cdot 5\cdot 8$  in. long; standard rounded, not spurred, white veined inside. *Stamens* 2-adelphous. *Pod* glabrous, straight, flat, rigid, coriaceous, strap-shaped, 8-10 seeded, slightly thickened and obscurely repand at the sutures. *Seeds* dark-brown, reniform, glabrous.

KHASI and JAINTIA HILLS between 2,500 and 5,000 ft.

Fls. & Fr. 8-11.

**4. *Pueraria Thunbergiana* Benth. Syn. P. Thomsoni Benth. Vern. Suting, Suting-rit, Khasi.**

A large climbing shrub; branches slender, clothed with fine deflexed brownish hairs. *Common petiole* 4-6 in. long, brown-pilose; stipules 1 in. long, fixed by the middle, membranous, brown velvety. *Leaflets* 5-7 by 4-6 in., rotundorhomboid to ovate, lateral oblique, sharply acuminate, membranous, dark-green and nearly glabrous above and grey and thinly covered with very short adpressed hairs beneath when mature; lateral nerves 5-7 on either half, lowest pair basal; base subcuneate or rounded; petiolules upto  $\cdot 2$  in. long; stipels linear or subulate,  $\cdot 5\cdot 7$  in. long. *Racemes* simple, 8-15 in. long, dense-flowered towards the extremity; rachis stout, pubescent; bracts paired, about  $\cdot 3$  in. long, lanceolate, pubescent; pedicels very short, elongating in fruit, each with a pair of lanceolate adpressed pubescent bracteoles,  $\cdot 1\cdot 15$  in. long at the top. *Calyx*  $\cdot 5\cdot 6$  in. long, deeply divided into lanceolate teeth,  $\cdot 3\cdot 45$  in. long, silky pubescent outside. *Corolla* purple or reddish, 1 in. long, sweet scented; standard sub-orbicular,  $\cdot 5\cdot 65$  in. across, emarginate, distinctly spurred. *Vexillary stamen* free. *Pod* 4-5 by  $\cdot 35\cdot 5$  in., flat, straight, 8-16 seeded, densely covered with patent rusty hairs.

KHASI HILLS, 45,500 ft.

Cattle and buffaloes browse on the leaves.

Flrs. 8-9. Fr. 9-10.

**5. *Pueraria phaseoloides* Benth.** Vern. *Jermei-kyn-saw*, Synt.; *Jermei-soh-gonsoh*, Khasi.

A twining annual, often trailing on sandy beds of streams; young shoots covered with patent brown hairs. *Common petiole* 2-4 in. long, covered with ascending hairs; stipules basifixed, lanceolate, closely ribbed, strongly ciliate with long brown hairs. *Leaflets* 2-5 in. long and almost as broad, sub-rhomboid to broad ovate, lateral oblique, obtuse or acute, very shallowly lobed or sometimes not lobed at all, membranous, green above, grey or glaucous and somewhat satiny beneath, adpressed hairy on both surfaces; lateral nerves 3-5, almost straight; lowest pair basal; lateral petioles  $\cdot 15\text{--}2$  in. long; stipels setaceous. *Racemes* simple, 4-9 in. long, long-peduncled; pedicels about  $\cdot 15$  in. long, slender; bracts and bracteoles lanceolate, closely ribbed, ciliate. *Calyx*  $\cdot 3\text{--}4$  in. long, adpressed hairy outside; teeth terminating in bristles. *Corolla* pale blue or reddish upto  $\cdot 75$  in. long. *Vexillary stamen* generally free. *Pod* 3-5 by  $\cdot 15$  in., reflexed, linear, sub-terete, straight, black when mature, thinly clothed with stiff adpressed hairs, 10-20 seeded; sutures not thickened. *Seeds* black, transversely oblong.

In open evergreen forests in the SURMA VALLEY, e.g., Badarpur, Isamati, etc. KHASI HILLS up to 4,000 ft. e.g., Shangpung (Jowai Sub-Division); also in GOALPARA.

A useful strong white fibre is extracted from the stem and switchy branches, which is made into twines or ropes.

Flrs. 9-10. Fr. 10-11.

**6. *Pueraria subspicata* Benth.**

Very similar to the preceding species with more deeply lobed somewhat larger and harsher leaflets, larger flowers, and less cylindrical pods with thickened sutures. The fibre is probably equally good.

Flrs. 9-10. Fr. 10-11.

## 25. PHASEOLUS Linn.

**Phaseolus calcaratus** Roxb. Vern. *Rumbai*, Khasi.

A twining herb; stem covered with spreading grey hairs. *Leaves* 3-foliolate; common petiole 5-6 in. long; stipules adpressed, .2-.3 in. long, subfalcately lanceolate. *Leaflets* 1.5-3.5 by .8-2 in., rhomboid-ovate, often obscurely lobed, tapering acuminate, cuneate at the base, membranous, sparsely hirsute or glabrescent; lateral nerves about 5 on either side of the midrib, the lowest pair basal; stipels setaceous, about .15 in. long. *Racemes* 3-5 in. long, elongate, 10-20 flowered; bracts lanceolate and subfalcate, about .2 in. long; bracteoles about .1 in. long, linear, caducous. *Calyx* cup-shaped, about .1 in. long, membranous; teeth triangular, shorter than the tube. *Corolla* .5 in. long, pale-yellow, the keel terminating in a twisted beak. *Stamens* diadelphous. *Ovary* sessile, many-ovuled; style filiform, twisted with the keel, bearded; stigma oblique. *Pod* 2-3 by .2 in., slightly compressed, 8-12 seeded, septate between the seeds, slightly scabrous when young. *Seeds* .2 by .15 in., oblong, brown, smooth.

KHASI HILLS up to 5,000 ft., where it is truly wild, possibly also in the plains. It is cultivated in other Provinces for the sake of the seeds which are used as a pulse.

Flrs. 8-9. Fr. 10-11.

## 26. DYSOLOBIUM Prain.

**Dysolobium grande** Prain. Syn. *Phaseolus velutinus* Grah. Vern. *Bahdar-kakua* (?), Ass. (Nowg.); *Makai-phok*, Caro.

A large woody climber; branches terete, minutely pubescent. *Leaves* pinnately 3-foliolate; rachis 5-9 in. long; stipules lanceolate, .3-.5 in. long. *Leaflets* 5-9 by 4-6 in., broadly subrhomboid-ovate or sub-orbicular, lateral oblique, cuspidate-acuminate, chartaceous, green and glabrescent above, pale and more or less scabrid along the nerves beneath, specially when young; base rounded or broadly cuneate; lateral nerves on either side of the midrib; petiolules .2-.25 in. long; stipels terminal, setaceous, lateral subulate and longer. *Racemes* 12-20 in. long including the peduncle, which is 9-15 in. long, 8-12 flowered; pedicels up to .15 in.; bracteoles small,

broad, adpressed to the calyx. *Calyx* about .5 in. long, silky; upper four teeth triangular obtuse; lowermost longest and lanceolate, all shorter than the tube. *Corolla* about 1.5 in. long, reddish; standard 1 in. broad; keel with a long lateral depressed beak. *Stamens* 2-adelphous (9+1). *Ovary* sessile, many-ovuled; style filiform, bearded. *Pod* 5-8 in. long and about .7 in. across in the middle, stout, sub-cylindric, pointed at both ends, deeply longitudinally channelled along sutures, woody, densely brown-velvety outside, septate between the seeds. *Seeds* 8-12, of which however usually not more than half fully developed, with a reticulately hirsute testa.

Plains of the BRAHMAPUTRA VALLEY also up to 2,000 ft. in the KHASI and GARO HILLS, often with a tendency to be gregarious.

Flrs. rainy season. Fr. 11-3.

## 27. VIGNA Savt.

*Vigna vexillata* Benth. Vern. *Jermei-soh-lang-tor*, Khasi.

A slender twiner with fusiform tuberous roots; stem terete, more or less scabrid with deflexed hairs. *Leaves* 3-foliolate; common petiole 2-3 in. long, hairy; stipules .15-.25 in. long, basifixed, lanceolate, strongly ribbed. *Leaflets* 3-5 by .5-1.5 in., narrowly lanceolate, less-often ovate-lanceolate, finely acuminate, more or less rounded or truncate at the base, membranous, dark-green above, scabrid with adpressed hairs on both surfaces; lateral nerves about 4 on either side of the midrib, lowest pair basal or sub-basal, oblique, arched, reticulations close and fine; lateral petiolules .1-.15 in. long, shaggy with rusty hairs; stipellæ minute, setaceous. *Peduncles* 3-10 in. long, tapering, hirsute with reflexed hairs. *Flowers* so congested at the end of the peduncle as to appear to be in heads. *Calyx* about .5 in. long, sub-campanulate with long hairy teeth. *Corolla* purple, very finely veined with deeper purple, 1.1-1.5 in. long; standard as broad as long; keel beaked. *Style* filiform, bearded along the inner margin. *Pod* 3-4 by .25 in., slightly compressed, scabrid with dark-brown bristly hairs, 15-20-seeded; seeds dark-brown or almost black, broader than long.

KHASI HILLS 3-5,000 ft., e.g., Nongstoin, Umran, etc.

The seeds are used as a pulse and the tuberous roots are eaten.  
Fls. 8-9. Fr. 9-10.

*Vigna Catjang* Endl. Vern. *Urhi-mah*, Ass.; *Barhati*, Beng.—is cultivated in kitchen gardens. The tender pods are used as a vegetable and the seeds as a pulse. A green dye is obtained from the leaves.

## 28. DOLICHOS Linn.

Twining herbs with stipellate trifoliolate leaves. *Flowers* in axillary racemes or in axillary fascicles of 2-3 or solitary; bracts and bracteoles minute, *Calyx-tube* campanulate. *Corolla* much exserted; standard orbicular, auricled at the base; wings oblong obovate, slightly adnate to the keel; keel incurved, not twisted. *Stamens* 2-adelphous. *Ovary* subsessile; style thickened upwards and bearded along the inner face or filiform and bearded only round the stigma. *Pod* flat, linear to linear-oblong, recurved. *Seeds* large, thick.

### I. Style filiform, hairy round the stigma :—

Root tuberous. Flowers pink or purple on slender bracteate peduncles. Calyx glabrous. Pod 6-8 seeded. . .

1. *D. falcatus*.

Root annual. Flowers yellow, 1-3 together from the axils, not racemed. Calyx downy. Pod 5-6 seeded. . .

*D. biflorus*,

### II. Style thickened upwards, bearded on the inner face. Flowers on elongate racemes.

2. *D. Lablab*.

#### 1. *Dolichos falcatus* Klein.

A slender perennial twiner with tuberous roots; stem at first pilose, glabrescent afterwards; stipules small, persistent. *Leaflets* 1-3 in. long, ovate, often slightly 3-lobed, pilose or glabrescent. *Flowers* 2-8 on an axillary peduncle up to 2 in. long; pedicels very short. *Calyx* glabrous; teeth deltoid. *Corolla* pink or purple, about .5 in. long; keel obtuse. *Pod* 2-3 by .35 in., linear, glabrous, with 6-8 kidney-shaped seeds.

Said to occur in the KHASI HILLS up to 6,000 ft.

Fls. & Fr. 11-12.

*Dolichos biflorus* Linn. Vern. *Kulthi*, *Kurthi*, Beng.: *Kulthi-Mah*, Ass.; The 'Horse Gram' of Madras.

An annual suberect or twining plant with hairy stem; stipules scarious. *Leaflets* 1-2 in. long, ovate, acute, not lobed, membranous, pilose. *Flowers* pale yellow, 1-3 independently from the axils of the leaves without a common peduncle. *Calyx* downy; teeth elongate, exceeding the tube. *Corolla* about .5 in. long; standard with a

crimson spot; keel obtuse, shorter than the standard. *Pod* 1·2 by ·25··3 in., adpressed hairy. *Seeds* 4·6, reniform, grey or blackish.

Believed to occur in Assam. Much cultivated in Chota Nagpur and Madras both for the pulse and the straw which is an excellent fodder.

Flrs. 9-11. Fr. 10-12.

**2. *Dolichos Lablab* Linn.** Vern. *Urohi*, Ass.; *Shim*, Sim, Beng.

A large climber generally with sarmentose branches. *Stipules* basifixed. *Leaflets* 2·6 in. long, broadly ovate or rhomboid, shortly acuminate, lateral oblique; base cuneate, strongly 3·5 nerved. *Peduncles* 3·9 in. long, axillary or terminal, with tumid nodes; pedicels fascicled. ·15··25 in. long; bracteoles oblong. *Calyx* ·25 in. long, campanulate. *Corolla* red, purple or white; standard up to ·75 in. in breadth; keel beaked. *Style* thickened upwards, bearded down the inner face. *Pods* white, pink or purplish, 3·6 by ·5·1·5 in. flat, valves tight. -(in var. *lignosus* green sub-cylindrical and torulose valves loose). *Seeds* large, oval, reddish or black.

This is represented by a large number of cultivated varieties chiefly grown in village kitchen gardens.

Fl. & Fr. 10-2.

## 29. CLITORIA Linn.

***Clitoria mariana* Linn.**

A scandent undershrub with thin terete branches. *Leaves* imparipinnate, usually 3-foliolate. *Common petiole* 1·5·3 in. long, slender, glabrous; stipules lanceolate. ·15··3 in. long, closely parallel nerved. *Leaflets* 1·5·4 by ·6·1·6 in., ovate elliptic or lanceolate, more or less acute or shortly acuminate, mucronate, chartaceous, glabrous, green above, pale beneath; lateral nerves 10-12 on either side, anastomosing near the margin, prominent beneath; base rounded or subacute; lateral petiolules ·1··15 in. long; stipels setaceous to subulate about ·1··2 in. long. *Peduncles* axillary, ·5·2 in. long, slender, glabrous, usually 2-flowered, with a pair of small bracts at the apex, ·1··2 in. long; bracteoles two to each flower, about ·2 in. long, elliptic or oblong, acute, membranous. *Calyx*



·6-·8 in. long, tubular, membranous, glabrous; lobes ·2-·25 in. long, lanceolate. *Petals* whitish or pale blue, glabrous; standard 1·5-2 by 1-1·3 in., much exceeding the other petals. *Stamens* 1-adelphous, the vexillary one being absent. *Ovary* stalked, many ovuled; style compressed, incurved, bearded along the inner side. *Pod* 1-1·5 in. long, 1-3 seeded, glabrous, septate and adpressed on the sides between the seeds crowned with the long persistent style and seated on the marcescent calyx. *Seeds* about ·25 by ·12 in., transversely oblong, dark-brown.

KHASI HILLS, 7-6,000 ft. Deserves to be cultivated for its handsome flowers.

Fls. 7-8. Fl. 9-10.

*Clitoria ternatea* Linn. Vern. *Aparajita*, Beng. which has white or blue flowers, the latter often double, is cultivated in gardens in the plains towns and villages. It differs by having shorter petioles, 5-7 leaflets, solitary flowers on shorter peduncles and longer pods with 5-10 seeds. Its seeds and root-bark have medicinal properties.

### 30. FLEMINGIA Roxb.

Shrubs or undershrubs, rarely erect or trailing herbs. *Leaves* digitately 3-foliolate or simple, gland-dotted beneath, sometimes also above; stipules usually scarious with fine parallel veins. *Flowers* in axillary or terminal simple or compound racemes, rarely in cymes or heads, sometimes with large conduplicate bracts; bracteoles minute or 0. *Calyx-tube* narrow. *Corolla* more or less exserted; standard auricled at base; wings obliquely oblong or obovate, adnate to the slightly beaked keel. *Stamens* 2-adelphous (9+1); anthers uniform. *Ovary* subsessile, 2-ovuled; style beardless; stigma capitate. *Pod* obliquely oblong, inflated, continuous within, 2-seeded; seeds orbicular, attached to the funicle at the centre.

#### I. Leaves 1 foliolate :—

Flowers in cymose clusters arranged in racemes, cymes hidden by a pair of large persistent membranous conduplicate bracts. . . . .

1. *F. strobilifera*.

#### II. Leaves 3 foliolate :—

##### A. Flowers in racemes :—

1. Flowers not small; racemes spike-like; bracts not conduplicate :—

- a. Branches sharply angled; stipules over 2 in. long, rigid; bracts large, exceeding the flowers. . . . . 2. *F. stricta*.
- b. Branches not sharply angled or subterete; bracts small not exceeding the flowers, thin :—
- i. Racemes congested, usually not exceeding the petioles :—
- Erect shrub, 4-6 ft. high; leaves ovate or oblong lanceolate. . . . . *F. congesta*.
- Suberect or prostrate undershrub under 3 ft. high; leaves narrow lanceolate. . . . . 4. *F. prostrata*.
- ii. Racemes elongate, 4-6 in. long :—
- Base of leaflets 3-4 nerved. Leaf glands not persistent; bracts long, acute or acuminate; pods almost glabrous. . . . . 5. *F. semialata*.
- Base of leaflets 5 nerved; leaf glands persistent; bracts short, subacute or obtuse, densely brown felted; pods gland pubescent. . . . . 6. *F. latifolia*.
2. Flowers very small in lax peduncled often paniced racemes exceeding the leaves. Bracts not conduplicate, small. An undershrub. . . . . 7. *F. lineata*.
- B. Flowers in heads :—
- Erect shrub, surrounded by large bracts. . . . . 8. *F. involucrata*.
- Trailing herb with tuberous root; bracts small, caducous. Cultivated. . . . . 9. *F. vestita*.

1. *Flemingia strobilifera* R. Br. Vern. *Makhloti*, Upp. Ass.; *Makhloti*, Ass. (Kam.); *Ka-Khong*, Khasi.

A shrub usually 5 ft. high but sometimes up to 10 or even 12 ft.; stem blackish, rough; branches terete, more or less

velvety. *Leaves* 1-foliolate, 3-6 by 1-3 in., oblong to ovate-lanceolate, acute or acuminate, rounded at the base, chartaceous or subcoriaceous, green and glabrescent above, pale, thinly silky pubescent and with garnet-like gland dots beneath; lateral nerves 8-12 on either side of the midrib, often sub-opposite, very oblique, almost straight, rusty pubescent; tertiary nerves transverse; petiole .2-.75 in. long, swollen at both ends; stipules .2-.4 in. long, linear-lanceolate, acuminate, scarious. *Flowers* about .3 in. long, purplish, first in small 3-4 flowered cymes hidden in the axils of large kidney-shaped conduplicate membranous bracts, .8-1.4 in. across, often cuspidate at the apex, which again are arranged in terminal and axillary racemes, 3-6 in. long; rachis zigzag, downy; bracts translucent, scarious with age, strongly reticulate, more or less puberulous, sparsely gland dotted on the inner surface; bracteoles minute, linear, caducous. *Calyx* velvety and gland dotted outside; teeth linear-lanceolate, almost longest. *Corolla* glabrous, exserted. *Pod* .3-.4 in. long, finely downy, 2-seeded.

Grass lands in UPPER ASSAM and sal areas in LOWER ASSAM; also up to 4,000 ft. in the KHASI HILLS.

At the end of the month of Chaitra (= about the middle of April) cattle are given a special bath in the Assam Valley after which they are gently beaten with the branches of this plant to keep them free from disease.

Flrs. 2-3. Fr. 4-6.

**2. *Flemingia stricta* Roxb.** Vern. *Dangshu-khop*, Mech; *Mi-surung-pu-arong*, Mik.; *Kombat-lai-jiri*, Khasi.

A sparingly branched shrub 6-12 ft. high; branches 3-quetrous, hairy. *Leaves* digitately 3-foliolate; common petiole 2-5 in. long, 3-quetrous or flattened, scarcely or very narrowly winged, furrowed; stipules 2-4 in. long, lanceolate, acuminate, finely silky outside, rigid and closely longitudinally parallel veined. *Leaflets* 6-12 by 2.5-4 in., lanceolate or oblong-lanceolate, gradually narrowed to a sharp apex, terminal narrowed also to the base, lateral oblique, the outer half being rounded at the base, subcoriaceous, glabrous or somewhat hispid above, pubescent along the nerves beneath; glandular dots few, minute, black, opaque; lateral nerves 12-20 on either half, very oblique, slightly arched; petiolules .15-.3 in. long,

terete, stout, densely rusty-silky. *Racemes* 3-4 in. long, spicate, dense-flowered; bracts caducous, .6-1.5 in., resembling the stipules in every respect excepting in size imbricating when young, giving the inflorescence a cone like appearance in bud; pedicels very short. *Calyx tube* about .12 in. deep: teeth long, the lowest as long as the corolla, densely hairy. *Corolla* .3-.45 in. long, purple. *Pod* .5-.6 in. long, glabrescent.

In shady and more or less damp localities in the PLAINS, also in ravines in the HILLS in both Valleys.

Flrs. 1-3. Fr. 6-9.

**3. *Flemingia congesta* Roxb.** Vern. *Samnaskhat*, Caro.

A shrub 4-6 ft. high; old stem terete, glabrescent; branches flattened or angular, slightly ribbed, adpressed silky pubescent when young. *Leaves* 3-foliolate; common petiole 2-4 in. long, flattened, often margined but never winged, sulcate; stipules .5 in. long, linear-lanceolate or triangular, scarious, caducous. *Leaflets* 4-6 by 2-3 in., ovate or oblong-lanceolate, acute or shortly acuminate, the lateral oblique, glabrescent but more or less scabrid above, pubescent along the nerves and with brownish glandular dots beneath; base in terminal leaflet cuneate, in the lateral leaflets rounded on the outer margin, strongly 3-nerved; main lateral nerves about 6 on either side of the midrib above the basal pair. *Racemes* usually dense, 1-2 in. long, sessile, sometimes branched; often fascicled; bracts about .2 in. long, lanceolate, sharply acute or acuminate, scarious, silky caducous; pedicels very short. *Flowers* about .5 in. long, purplish. *Calyx* densely silky, gland dotted; teeth lanceolate, lowest longest but narrower. *Corolla* as long as the calyx; standard greenish-white, striped with pink. *Pod* about .5 by .3 in., turgid, obscurely brown-velvety, gland dotted when young, 2-seeded. *Seeds* about .1 in. diam., brown or blue-black, shining.

Fairly common in dampish localities throughout the plains of both VALLEYS, specially in submontane regions.

In Var. *typica* the petiole is scarcely margined. In our area var. *viridis* Prain appears to be common which differs from the type in having the petioles slightly winged towards the top.

A purple dye is obtained from the glands at the base of the hairs covering the pods.

Flrs. 4-8. Fr. 11-2.

**4. *Flemingia prostrata* Roxb.** Syn. *F. congesta* var. *semialata* *F. B. I.* in part.

A suberect or trailing undershrub up to 2.5 ft. long; stem angled, grooved, silky tomentose when young. *Leaves* 3-foliolate; petiole 3 angled, slightly or not winged, silky pubescent; stipules .3-.4 in. long, scarious, lanceolate. *Leaflets* 1.5-3 by .3-.5 in., narrow-lanceolate, cuspidate-acute; base of terminal leaflet cuneate; lateral leaflets oblique and rounded on the outer side, subcoriaceous, somewhat rough and thinly pubescent or glabrescent above, softly brown tomentose beneath; basal nerves usually 3, short; lateral nerves 6-8 on either side above the basal, all impressed above, prominent beneath. *Racemes* very dense, usually shorter than the petioles; bracts up to .3 in. long, lanceolate, acuminate, densely pubescent outside. *Flowers* up to .25 in. long, pink and yellowish green. *Calyx* densely villous; lobes linear, acuminate, lower exceeding or equalling the corolla. *Pod* hairy, gland dotted when young up to .4 in. long.

KHASI HILLS, 5,000 ft., Mann. Probably in grass lands in other Districts also.

The stems are usually annual from a perennial root stock. This plant appears to be a degenerate and dwarfed form of *F. congesta*, but as it has sufficiently well-marked characters differentiating it from that species it has been separated.

Flrs. 8-9. Fr. 9-11 ?

**5. *Flemingia semialata* Roxb.** Syn. *F. congesta* var. *semialata* *F. B. I.* Vern. *Salpan*, Beng.; *Bhatte*, Nep.; *Achakkimi-chong*, (=dog's tail), Garo; *Papai*, Jharua; *Kelbe*, Tipp.

A shrub very closely resembling *F. congesta*, but generally much taller; the branches more sharply angular; the petiole shorter and winged; leaflets 3-4 nerved at the base; the racemes much longer (up to 6 in.) exceeding the petioles and laxer; calyx-teeth narrower and the pod only very slightly pubescent. *Flowering* and fruiting time and

habit about the same, but it ascends to a higher elevation, nearly up to 5,000 ft.

Wood with discontinuous concentric soft wavy bands and close continuous medullary rays, not durable.

**6. *Flemingia latifolia* Benth.** Syn. *F. congesta* var. *latifolia* F. B. I. Vern. *Jambru-soh-attekk-arong*, Mik.

A robust shrub up to 10 or 12 ft. in height with dark-brown cylindrical stem, and obscurely angular sulcate branches. *Leaves* 3-foliolate; common petiole 2·5-4·5 in. long, flattened and narrowly margined. *Leaflets* 4-9 by 2·3-5 in., elliptic or obovate-lanceolate, chartaceous or sub-coriaceous, acute or acuminate, finely tomentose and dotted with long persistent ruby or garnet coloured glands on both surfaces, base acute, in lateral leaflets sometimes rounded on the outer margin, strongly 5-costate; inner pair of nerves often running to near the top; petiolules 2·25 in. long, stout, terete, densely velvety. *Racemes* terminal and lateral, 2-5 in. long, solitary or in fascicles of 2-3; rachis stout, swollen at nodes, greyish or brown silky-tomentose; bracts 3·4 in. long, obtuse or sub-acute, concave, densely silky-tomentose. *Calyx* cup-shaped; teeth 2·4 in. long, lanceolate, brown velvety outside, pubescent and thinly gland dotted within. *Corolla* purple, 4·5 in. long. *Pod* 5 by 2 in., hairy and dotted with glands; seeds 1 in. diam., globose, dark-brown.

Fairly common, GARO, KHASI and NORTH CACHAR HILLS, up to 4,000 ft.

Flrs. 10-11. Fr. 12-2.

**7. *Flemingia lineata* Roxb.**

A diffuse erect undershrub 3-5 ft. high; stem terete, glabrescent, blackish; branchlets obscurely angled, pubescent. *Leaves* 3-foliolate, generally not exceeding 4 in. in length; common petiole 5·7 in. long, margined, scarcely winged; stipules 25·4 in. long, lanceolate, slightly falcate, scarious. *Leaflets* subsessile, 8-3 by 3·8 in., obovate lanceolate or elliptic-oblong; lateral leaflets oblique; apex sub-acute, often, cuspidate, usually 3 nerved and cuneate at the base, chartaceous, plicate between the nerves, subcoriaceous,

glabrescent above, silky pubescent, specially along the nerves and with minute light yellow gland beneath; lateral nerves 3-5 on either half (excluding the basal), very oblique; intramarginal nerve 0 or very obscure. *Racemes* terminal and axillary, 1.5-3 in. long, few flowered, lax, often paniced; rachis slender, pubescent; bracts about .15 in. long, deltoid or subulate, scarious. *Flowers* usually towards the upper portions of the racemes; bracteoles minute, linear, hairy. *Calyx* .2 in. long, hirsute; teeth as long as the tube. *Corolla* purple, not or only slightly exerted. *Pod* .3-.4 by .15 in., obliquely oblong, with short silky bristly hairs, glandular bases outside; seeds 2, black, slightly truncate at the base.

Gregarious on banks and islands of the Brahmaputra below GOALPARA forming dense thickets where it occurs e.g., Kareya in the Mechpara Estate.

Flrs. & Fr. 9-11.

### 8. *Flemingia involucrata* Benth

An erect shrub 3-5 ft. high; stem terete, more or less zigzag, patently downy, very finely striate. *Leaves* 3-foliate; common petiole .4-.5 in. long, slightly channelled, brown-felted; stipules as long as the petiole or shorter, lanceolate, scarious-hairy, caducous. *Leaflets* 1.5-3 by .7-1.25 in., elliptic-oblong, lateral oblique, chartaceous, green and somewhat rough above, grey-tomentose and with dark-brown gland dots beneath; lateral nerves 10-15 on either half, slender, straight, continuous; intramarginal nerve 0 or very obscure. *Heads* about 1 in. broad, many flowered, both terminal and axillary, villous, supported by a whorl of 9-12 lanceolate, sharply acuminate, scarious bracts with densely ciliate margins, .4-.6 in. long; peduncle about .5 in. long with usually 2 pairs of decussate bracts which are somewhat broader and shorter than those of the involucre. *Calyx* .5-.7 in. long, densely grey-shaggy; teeth very long, subulate. *Corolla* wholly included, purple; keel obtuse. *Pod* about .2 in. long, oblong, canescent, more or less papery, 1-seeded; seed about .1 in. long, dark-brown or almost black, shining.

Apparently rare. Only once found by the senior author in grasslands at Kaziranga, SIBSAGAR DISTRICT.

Flrs. 9-10. Fr. 11-12.

### 9. *Flemingia vestita* Benth. Vern. *Soh-phlang*, Khasi.

A much branched trailing herb 1-3 ft. long with patently hirsute wiry stems. *Leaves* 3-foliolate; common petiole .5-1.5 in. long, slender, patently hairy; stipules about .2 in. long, ovate to oblong-lanceolate, scarious. *Leaflets* .5-1 by .4-.8 in., rhomboid or obovate-cuneate, usually sub-acute, overlapping by their margins, sub-membranous, ciliate, green above, pale and with dark-brown glandular dots beneath, sparsely pubescent on both surfaces; petioles very short. *Peduncles* 2-3.5 in. long, mostly terminal, hairy, bearing a 3-6 flowered head of subsessile flowers about .5 in. long; bracts about .1 in. long, boat-shaped, cuspidate. *Calyx* .3-.4 in. long, densely brown velvety; teeth longer than the tube. *Corolla* deep purplish-red, distinctly exerted; keel much incurved, beaked. *Pod* cylindrical, finely hairy, 1-seeded.

Doubtfully wild. Much cultivated as a field crop in the KHASI HILLS for the sake of its tuberous roots which are eaten raw by the Khasis. The tubers are 1-5.2 in. long and are rubbed clean of the outer skin by trampling by the feet in running water, when they acquire a creamy white, smooth surface.

Flrs. 8-10. Fr. 10-12.

### 31. ERIOSEMA DC.

#### *Eriosema chinense* Vogel. Vern. *Soh-pen* or *Pen*, Khasi.

An erect undershrub 1-2 ft. high growing from a tuberous rootstock; stem slender, sparingly branched, covered with patent brown hairs. *Leaves* 1-foliolate; stipules about .15 in. long, subulate, persistent. *Leaflet* .5-2 by .1-.25 in., ligulate, acute or sub-acute, cuspidate, sub-coriaceous, margins recurved, pilose, dark-green and with a few adpressed hairs above, glaucous, densely grey canescent with concealed glands beneath; midrib prominent, brown pilose; lateral nerves very oblique, indistinct. *Flowers* axillary, solitary or two together. *Calyx* .1-.15 in. long, densely pilose. *Corolla* .2-.3 in. long, yellowish, finely purple



veined, fading to reddish purple; standard roundish, auricled at the base, patently hairy-wings, obovate-oblong, shorter than the standard, but exceeding the keel; keel slightly beaked, gland dotted and hairy towards the top. *Stamens* 2-adelphous. *Ovary* sessile, 2-ovuled, densely villous with spreading silky-hairs; style filiform, glabrous; stigma capitate. *Pods* about .4 by .2 in., compressed, often slightly inflated, densely pubescent, 1-2 seeded. *Seeds* oblique with the funicle attached to the end of a linear hilum.

KHASI HILLS, 45,000 ft., fairly common in grass-lands.

The tuberous roots are eaten raw and their cortex is used medicinally.

Flrs. & Fr. 6-10, probably most of the year.

**Rhynchosia viscosa** DC. Vern. *Bhim-khatraj*, Beng.

A wide spreading climber (woody); young parts glandular-pubescent. *Leaves* usually 3-foliolate. *Leaflets* broadly ovate, acute, terminal one somewhat deltoid. *Racemes* lax, long-peduncled. *Corolla* twice the calyx. *Pod* finely pubescent. *Seeds* not arillate.

Aka Hills. (15321).

### 32. DUNBARIA W. & A.

Woody climber or twining herbs. *Leaves* pinnately 3-foliolate; stipules setaceous; leaflets gland dotted beneath; stipules rarely present. *Racemes* axillary, flowers generally in pairs; bracts ovate, membranous, caducous; bracteoles 0. *Calyx-tube* campanulate; teeth long and narrow. *Corolla* exserted; standard orbicular, auricled; keel incurved, not beaked. *Stamens* 2-adelphous; anthers uniform. *Ovary* sessile or stalked, many-seeded; style inflexed, beardless. *Pod* compressed, not depressed between the more or less orbicular seeds.

#### I. Leaflets membranous, rhomboid or ovate:—

- |   |       |                           |
|---|-------|---------------------------|
| Terminal leaflet acuminate; flowers distinctly stalked. | .. .. | 1. <i>D. circinalis</i> . |
| Terminal leaflet acute; flowers subsessile.             | .. .. | 2. <i>D. conspersa</i> .  |

#### II. Leaflets subcoriaceous, ligulate-oblong; terminal rounded at both ends; pedicels as long as the calyx. .. ..

3. *D. debilis*.

**1. *Dunbaria circinalis* Baker.**

A slender woody climber with terete glabrescent stem. *Stipules* minute, caducous. *Leaflets* broadly ovate, acute or acuminate, green and glabrescent above, finely downy beneath. *Flowers* in 6-10 flowered, subsessile, compact racemes. *Calyx* .3 in. long. *Corolla* slightly exserted. *Pod* 2-3 by .35 in., stalked, 8-10 seeded.

Plains of the BRAHMAPUTRA VALLEY.

**2. *Dunbaria conspersa* Benth.**

A filiform twining herb with downy stem. *Stipules* minute, linear. *Leaflets* orbicular-rhomboid, green and glabrescent above, pale green, obscurely downy and gland dotted beneath. *Flowers* 1-2, rarely 3-4 on very short stalks in the axils of the leaves. *Calyx* .25 in. long. *Corolla* reddish, .35-.5 in. long; keel beaked. *Pod* 1.5-2 by .3 in., recurved, 6-8 seeded.

Plains of both VALLEYS.

**3. *Dunbaria debilis* Baker.**

A slender twining herb with downy stem. *Stipules* setaceous persistent. *Leaflets* 3-4 times as long as broad, densely canescent beneath, strongly nerved. *Calyx* .25 in. long, grey-downy; teeth linear. *Corolla* yellowish, about .35 in. long; keel beaked. *Pod* linear, recurved, 1.5-2 by .25 in., glabrescent, 8-10 seeded.

KHASI HILLS, 4-5,000 ft

**33. ATYLOSIA W. & A.**

*Leaves* 3-foliolate; stipules small, generally caducous; leaflets gland dotted beneath. *Flowers* in few flowered, long-peduncled racemes, rarely axillary. *Calyx-tube* cup-shaped; teeth distinct. *Corolla* more or less exserted. *Stamens* diadelphous. *Ovary* sessile; ovules 3 or more; style filiform, incurved, glabrous. *Pod* generally oblong, more or less turgid, marked with transverse lines between the seeds. *Seeds* strongly strophiolate.

Terminal leaflet comparatively longer, petioluled; pod 5-6 seeded.   ..   ..   ..   1. *A. barbata*.  
 Leaflets all equally and shortly petioluled;  
 pod 3-4 seeded.   ..   ..   ..   2. *A. elongata*.

### 1. *Atylosia barbata* Baker.

A woody climber with densely pubescent terete branches. *Common petiole* 1-3 in. long, fairly stout, pubescent; stipules about .2 in. long, subulate, caducous. *Leaflets* 2-4 by 1.5-3 in., ovate-rhomboid, rounded and often abruptly subcordate at the base, subcoriaceous, green and somewhat hispid above, greyish and softly pubescent beneath; lateral petiolules about .1 in. long, terminal .5-.7 in. long; stipels bristle-like, minute. *Racemes* terminal or axillary, 3-6 in. long, elongating in fruit, patently pilose; peduncle 2-3 in.; bracts ovate, densely hairy. *Calyx* .5 in. long, shaggy, greenish-grey; teeth about .3 in. long, lanceolate. *Corolla* about .6 in. long, yellowish. *Pod* 1.5-2.2 by .5 in., compressed, shaggy with shining brownish spreading hairs, 5-6 seeded; the depressions between the seeds slightly oblique.

SUB-HIMALAYAN TRACT. Bijni Reserve, GOALPARA.

Flrs. & Fr. 12-2.

### 2. *Atylosia elongata* Benth.

A slender herbaceous twiner tomentose throughout. *Common petiole* .8-3 in. long, slender. *Leaflets* .7-1.5 by .5-1 in., rhomboid-ovate; petiolule .05-.1 in. long. *Peduncles* 1-3 in. long, slender, 2-4-flowered; pedicels .2-.3 in. long, including the filiform teeth. *Corolla* purple, about .4 in. long. *Pod* .8-.4 in. long, beaked, 3-4 seeded.

In grass-lands in the KHASI HILLS.

Flrs. 8-9.

## 34. CAJANUS DC.

*Cajanus indicus* Spreng. Vern. *Arahar*, *Arhar*, *Oror*, Beng., Hind.; *Tuar* or *Tuwar*, Hind.; *Hrhaki*, *Tubarika*, Sans.; *The Pigeon pea*, Eng.

An erect shrub 6-10 ft. high with slender sulcate grey-silky branchlets; main stem terete, smooth, green, often

blotched with large black spots. *Leaves* 3-foliolate; common petiole  $\cdot 8\text{--}1\cdot 5$  in. long, slender, indistinctly ribbed; stipules minute. *Leaflets*  $1\cdot 5\text{--}3$  by  $\cdot 3\text{--}1$  in., narrowly elliptic or oblong-lanceolate, finely acute or acuminate, narrowed at the base, subcoriaceous, green above, grey beneath, silky-velvety, indistinctly gland dotted, minutely stipellate, aromatic when bruished; lateral nerves 5-6 on either half, arched, very oblique; lateral petiolules about  $\cdot 1$  in. long; terminal and axillary, long peduncled, silky-pubescent; flowers congested and corymbose at the extremity of the peduncle. *Calyx*  $\cdot 25$  in. long; tube campanulate, gland pubescent; teeth short. *Corolla*  $\cdot 6\text{--}\cdot 7$  in. long, yellow, sometimes veined with red. *Stamens* 2-adelphous; filaments alternately longer and shorter. *Style* long, filiform, up-curved; stigma capitate. *Pod*  $1\cdot 5\text{--}2\cdot 2$  by  $\cdot 3\text{--}\cdot 4$  in., 3-6 seeded, often with purple blotches or streaks, narrowed at both ends, somewhat torulose, with oblique depressions between the seeds, hirsute. *Seeds*  $\cdot 2$  in. diam., slightly compressed, not strophiolate; testa from brown-reddish-yellow to blackish or variegated.

The seed is an important pulse and lac is grown on the plant. Extensively cultivated for both purposes, specially in the GARO and MIKIR HILLS.

Flrs. 4-8. Fr. 10-2.

### 35. DALBERGIA Linn. f.

Trees or climbing shrubs. *Leaves* imparipinnate, with alternate exstipulate leaflets. *Flowers* small in terminal or axillary panicles; bracts and bracteoles small. *Calyx* campanulate; teeth 5, short. *Corolla* exserted, often only shortly; standard broad; wings oblong, as long as the standard; keel-petals obtuse, shorter than the standard, connate at the tip. *Stamens* 9 or 10, monadelphous or diadelphous, usually in two bundles of 5 each, rarely  $9+1$ ; anthers minute. *Ovary* stipitate, few-ovuled. *Style* short, incurved, glabrous; stigma capitate. *Pod* thin, flat, coriaceous, 1-4 seeded, indehiscent.

#### I. Trees :—

A. *Stamens* 9 in one bundle. *Pod* strap-shaped :—

*Leaflets* 3-5, rotundo-rhomboid, acuminate. *Flowers* in cymosely

- branched axillary panicles. Pod 1-3 seeded. . . . . 1. *D. Sissoo*.
- B. Stamens in two bundles of 5 each :—
1. Pod thin, strap-shaped :—
- a. Leaflets 9-15, obtuse, glabrate. Flowers in corymbosely branched axillary and terminal panicles. Pod 1-3 seeded :—
- Reticulations of tertiary nerves weak and open, panicles lax spreading; standard broad obovate or sub-orbicular with a hardened and thickened claw; wood continuous. . . . . 2. *D. lanceolaria*.
- Reticulations of tertiary nerves stronger and closer, panicles compact, standard narrow oblong or oblong-obovate; claw not thickened or hardened; wood with concentric rings of bast. . . . . 3. *D. paniculata*.
- b. Leaflets 15-21, obtuse, glabrate. Flowers in short axillary panicles. Pod 1-2 seeded. . . . . 4. *D. assamica*.
- Leaflets 17-27, obtuse, hairy. corymbose panicles. Pod 1-3 Flowers in congested axillary seeded. . . . . 5. *D. sericea*.
2. Pod rigid, orbicular :—
- Leaflets 7-11, acute, glabrous. Flowers in axillary racemosely branched panicles. Pod 1-seeded. . . . . 6. *D. reniformis*.
- II. Scandent shrubs :—
- A. Stamens 9, rarely 10, in one bundle. Pod strap-shaped :—
1. Leaflets 5-9, broadly oblong. Flowers very small in corymbosely branched axillary or terminal panicles. Pod 1-2 seeded. . . . . 7. *D. rimosa*.
2. Leaflets 9-15, oblong, glabrous. Flowers small, usually in corymbosely branched terminal panicles. Pod 1-2 seeded. . . . . 8. *D. confertiflora*.
3. Leaflets 13-17, oblong, pubescent. Flowers in corymbosely branched axillary panicles. Pod 1-3 seeded. . . . . 9. *D. tamarindifolia*.
4. Leaflets 25-33, oblong, not oblique at base. Flowers in short congested panicles. Pod 1-2 seeded. . . . . 10. *D. mimosoides*.
- B. Stamens in 2 bundles of five each. Pod strap-shaped :—

1. Leaflets 9-15, obtuse, glabrous. Flowers in axillary and terminal panicles. Pod 1-seeded. .. 11. *D. Thomsoni*.
2. Leaflets 9-13, obtuse, glabrous. Flowers ebracteate in axillary and terminal panicles. Pod 1-2 seeded. 12. *D. volubilis*.
3. Leaflets 17-25, obtuse, nearly glabrous. Flowers persistently bracteate and bracteolate in axillary panicles. Pod 1-seeded. .. 13. *D. stipulacea*.

1. **Dalbergia Sissoo** Roxb. Vern. *Hihu, Shisham* (Goal.) Ass.; *Khujrap*, Mech.

Ordinarily a middle-sized gregarious and deciduous tree, but in favourable localities quite a large tree; young parts grey-downy. Bark grey or light brown, somewhat reticulately longitudinally furrowed, exfoliating in narrow strips, inside light-brown, soon turning to dark-brown, very fibrous. Leaves 4-9 in. long; common petiole zigzag, pubescent when young; stipules .2 in. long, caducous. Leaflets 3-5, distinctly alternate, 1-2.5 in. across, ovate, obovate orbicular or rhomboid, firmly sub-coriaceous, abruptly acuminate and cuspidate; main lateral nerves about 5 on either half, rather indistinct; tertiaries prominent; petiolules .1-.3 in. long. Flowers .2-.3 in. long, in cymose racemes, 1-1.5 in. long, which are corymbosely arranged in axillary peduncled panicles, 2-3 in. long; pedicels minute, usually secund. Calyx downy, about half the length of the flowers; teeth short, lowest sub-acute and longest, others obtuse. Corolla yellowish-white, standard with a long claw. Stamens 9, united in a sheath which is slit along the top. Ovary pubescent; style short; stigma large. Pod 2-3 by .3-.5 in., strap-shaped, pale-brown, glabrous narrowed at the base to a stipe, .3-.4 in. long, mostly 1-seeded, less often 2-3 seeded, not veined over the seeds. Seeds .25 in. long, kidney-shaped, flat.

Throughout the SUB-HIMALAYAN TRACT from above Sadiya down to Kachugaon, on porous sandy and gravelly soils on islands and river banks.

Heartwood brown, mottled with darker longitudinal veins, close grained, very hard and durable; medullary rays very fine, transversely crossed by wavy whitish concentric bands; weight 45-55 lbs. per c. ft. A very valuable timber eminently suitable for furniture and for all purposes where strength and elasticity are required. The twigs and

leaves are lopped for fodder. The tree can be easily raised from seeds or root-cuttings. The best results are obtained from shoot cum root cuttings of healthy nursery raised seedlings.

Flrs. 2-5 with new leaves. Fr. 11-2.

## 2. *Dalbergia lanceolaria* Linn.

A large deciduous tree, sometimes buttressed at the base; bark smooth, greenish-grey or brownish-yellow inside but instantly turning brown on exposure; young parts rusty hairy. *Leaves* about a foot long; common petiole slightly pubescent; stipules .3 in. long, caducous, linear-oblong. *Leaflets* 7-17, usually 1-2.2 by .6-1.2 in., elliptic or oblong, rounded at the base, generally emarginate at the apex, subcoriaceous, glabrous and green above, lightly grey pilose and pale beneath; lateral nerves very indistinct, slightly arched; reticulations of tertiary nerves rather open; petiolules up to .2 in. long. *Panicles* axillary and terminal, 6-10 in. long with wide spreading branches, which are generally pubescent; bracts minute, caducous. *Calyx* about .1 in. long, silky outside; teeth unequal; upper teeth obtuse, lowest longest and acute. *Corolla* .2-.3 in. long, dull-white or pinkish white; standard broadly obovate or sub-orbicular, about .25 in. broad, with a greenish callosity at the base of the limb, somewhat abruptly bent from the hardened and thickened short claw longer than the wings, which again are longer than the keel. *Stamens* in two bundles of 5 each. *Pod* 2.5 by .5-.7 in., often sinuate between the seeds, and narrowed at both ends, flexible on a stipe, .3-.5 in. long, glabrous, light-brown, mostly 1-3 seeded, veined over the seeds.

UPPER ASSAM between Makum and Margherita, very rare.

Wood pale-yellow, not durable, no distinct heartwood.

Flrs. 5-6. Fr. 9-10.

## 3. *Dalbergia paniculata* Roxb.

Very similar to the above in appearance and the one is very likely to be mistaken for the other. The tertiary nerves of the leaves are more closely and more strongly reticulate, the undersurface is often more densely pubescent along the midrib, the panicles are compact and smaller and all calyx teeth are sub-deltoid. The standard is narrower being oblong-

obovate, often auricled and without any callosity at the base, and the claw is neither hardened nor thickened, but is longer than in the last species.

The wood is useless as timber, having bands of bast alternating with woody tissue.

A specimen collected by Mann, who does not mention the locality, has been referred to this species. It is too incomplete for verification. Very rare if it occurs at all in the province.

**4. *Dalbergia assamica* Benth.** Vern. *Medeluwa*, *Mouhita*, Ass.; *Murkimora*, *Cach.*; *Iling-kung*, Tipp.; *Peret-asing*, Miri & Abor; *Bon-subaim*, Mech.; *Dieng-maw-phur-wang*, *Dieng-khar-ir*, Khasi; *Dieng-kapudi*, *Dieng-khyrwang-sniang*, Synt.; *Pinhele-siris*, Nep.

A middle-sized deciduous tree attaining 80-90 ft. in height and 6-8 ft. in girth. *Bark* dark-brown, thin, rough, with more or less parallel vertical fissures, on old trees exfoliating in overlapping strips; inside fibrous, in thin plates, dun or yellowish-brown, turning deep brown on exposure, smelling somewhat like coffee. *Leaves* 9-12 in. long; common petiole terete, glabrous except when very young; innovations silky with adpressed buff or rusty hairs. *Leaflets* 15-21, 1.7-2.8 by .8-1.2 in., oblong, more or less rounded or subcuneate at the base; apex slightly emarginate, chartaceous or firmly membranous, green above, pale beneath, with adpressed pale hairs on both surfaces especially when young, turning yellow before falling; lateral nerves indistinct, oblique, slightly arched; petiolules about .15 in. long, always pubescent. *Panicles* axillary, 4-6 in. long, slender, pubescent. *Calyx* obconic, silky outside with the lowest tooth much longer and more pointed than the others. *Corolla* white or purplish blue, about .25 in. long; standard orbicular, purple veined, with a light green central spot; wings broad; keel incurved. *Stamens* in two bundles of 5 each. *Pod* 1.5-3 by .25-.5 in., strap-shaped, flexible, pointed at both ends, glabrous, on a slender stipe, .25-.35 in. long. 1-4 seeded, often warted over the seed.

Closely resembling *D. lanceolaria*.

A rare tree although occurring sporadically in every District, more common in UPPER ASSAM and in the N. E. FRONTIER DISTRICT ascending to about 3,000 ft. in the KHASI HILLS.



Wood light-pale brown, pores large, irregularly distributed, joined by fine wavy lines; medullary rays very fine and regular, fairly ornamental on a radial section.

Flrs. 4-5. Fr. 12-1.

**5. *Dalbergia sericea* G. Don. Syn. *D. hircina* Benth.** Vern. *Pered-asing*, Miri; other local names of the preceding species are indiscriminately applied where they occur together.

A middle-sized tree up to 80 ft. in height and 6 ft. in girth, often fluted in old age. *Bark* grey, smooth but with very close longitudinal fissures and distant horizontal wrinkles, on old stems, exfoliating in overlapping strips, inside pale yellow, soon turning yellowish brown. *Leaves* 6-12 in. long, rachis terete, persistently grey-hairy. *Leaflets* 17-27, 1-1.5 by .35-.7 in., elliptic or oblong, emarginate, subcoriaceous, persistently adpressed hairy on both surfaces, somewhat pale below, rather strongly veined; petiolules .15-.2 in. long. *Panicles* axillary, corymbose, congested; ramifications ascending, pubescent. *Calyx* about .1 in. long, campanulate, densely pubescent. *Corolla* about .2 in. long, whitish; standard obovate; keel shorter than the wings. *Pod* 1-1.5 by .2 in., very thin, strap-shaped, glabrous, 1-3 seeded, rarely 4-seeded; stipe about .2 in. long.

Very rare. Found along the foot of the Himalayas, e.g., near Sadiya in the N. E. FRONTIER DISTRICT, at Dikrang in LAKHIMPUR, at Charduar in DARRANG and at Maktaigaon in GOALPARA.

Wood greyish white, moderately hard with no distinct heartwood appears to season well, weighing about 40 lbs. per c.ft.

Flrs. 4-6. Fr. 10-11.

**6. *Dalbergia reniformis* Roxb. Vern. *Kures*, Sylh.**

A large bushy tree with brown-silky branches. *Leaves* 6-11 in. long. *Leaflets* 7-11, 1.5-2 in. long, ovate, acute, rounded at the base, coriaceous, glabrescent. *Panicles* axillary, dense, with silky ramifications. *Calyx* .12 in. long, campanulate, silky; teeth rounded. *Corolla* .2-.3 in. long, white; standard obovate, emarginate. *Stamens* in two bundles. *Pod* rigid, 1-1.2 by .25-.3 in., glabrous, usually 1-seeded, rarely 2-seeded, fleshy when ripe, joints reniform; stipe .25-.35 in. long.

SYLHET-Roxburgh, CACHAR-Frazer, in swampy localities.

Flrs. 3-4. Fr. 10-11.

**7. *Dalbergia rimosa* Roxb.** Vern. *Gajai-lata*, (Lakh.); *Mermeri-lata*, (Darr.), *Kata-ghoh* (Kam.), Ass.; *Sibou-doukha*, *Sibou-phang*, Kach.; *Mei-nup-synrang* (Tharia), *Jermai-bu-tem* (Nongkla), Khasi; *Dieng-thniat-nirai?* Synt.; *Khot*, Garo; *Hikongiru*, Tipp.; *Lewa-phukri*, Mech.; *Kawa-gurum*, Sylh.

A suberect straggling or climbing shrub with branchlets often formed into tendrils; dormant buds sometimes develop into spines about .3 in. long. *Bark* white outside, yellowish inside. *Leaves* 5-9 in. long; common petiole 2-5 in. long, terete, glabrescent. *Leaflets* 5-9, 2-4.5 by 1-3.5 in., elliptic, obovate or oblong, acute or rounded at the base; acute to obtuse, often emarginate, shortly cuspidate, chartaceous, glabrous, dark-green and shining above, pale and with short adpressed hairs beneath; main lateral nerves about 10 on either half with 1-3 minor ones between each two, arched, tertiaries strongly reticulate; petiolule about .15 in. long, usually pubescent. *Panicle* axillary and terminal, 4-8 in. long with corymbose branches and secund pubescent ramifications. *Flowers* very small (among the smallest in the Papilionatæ), sweet scented. *Calyx* .04 in. long, pubescent; teeth subequal, obtuse, subacute, ciliate. *Corolla* dull-white, scarcely .1 in. long. *Stamens* 10 in one bundle. *Pod* 2.5-4.5 by .7-1.2 in., strap-shaped, much thickened and strongly reticulate over the seeds. *Seeds* 1, rarely 2.

Throughout the plains of both VALLEYS.

The stem is used as axe handles. The seeds are eaten by the Cacharis.

Flrs. 4-5. Fr. 11-12.

### **8. *Dalbergia confertiflora* Benth.**

A woody climber. *Leaflets* 9-15, 1-2 by .5-.8 in., oblong or obovate, more or less emarginate and usually with a small cusp, glabrous, pale beneath, strongly veined. *Panicles* terminal and over a foot long or axillary and 2-4 in. long; ramifications densely pubescent. *Calyx* about .12 in. long, pubescent, supported by a pair of minute bracts.

*Corolla* .2-.25 in. long. *Stamens* 9, monadelphous. *Pod* 1.5-2.5 by .5-.6 in., thin and flexible, shortly stipitate, generally 1-seeded, veined over the seed or seeds.

Apparently not very common. KHASI HILLS—*Kurz*, DUFFLA HILLS—*Lister*, SYLHET—*Wallich*.

Fls. 1-3. Fr. 5-6 (?).

***Dalbergia velutina* Benth.**

Woody climber; branches densely brown-tomentose. *Leaves* 6-9 in. long, supported by large persistent velvety stipules. *Leaflets* 13-17, 1.5-2 by .8-1 in., oblong, obtuse at both ends, chartaceous, pale and densely rusty pubescent beneath. *Panicles* axillary, about 9 in. long, peduncled, corymbosely branched, rusty pubescent throughout; pedicels short, bracteate, congested at the ends of the corymba. *Calyx* about .1 in. long. *Corolla* .15-.2 in. long. *Pod* 2.2-5 by .6-.7 in., oblong, flat, deep tan-brown when dry, shining, very finely lanceolate, generally 1-seeded, rarely 2- or 3-seeded.

SYLHET, *Wallich's* catalogue 5868 B, KHASI HILLS, very scarce.

Fls. 12-2. Fr. 4-6.

**9. *Dalbergia tamarindifolia* Roxb.** Vern. *Laleng-chhali*, Ass. (Lakh.), *Dat-bijli*, Ass. (Kam.), *Bon-subai-doukha*, Kach.; *Subin-rikang*, Mik.; *Dukhentri*, *Khot*, Garo; *Jermei-thuat-siar*, Khasi; *Amlai-lewa*, Jharua & Mech; *Keti*, Beng. (Sylh.).

A large deciduous woody climber often with twisted greenish branchlets; stem blackish, not rough; young parts pubescent. *Leaves* 3-6 in. long; common petiole terete, pubescent. *Leaflets* 25-41, .5-1 by .15-.25 in., subsessile, oblong, slightly emarginate, oblique at the base, membranous, pubescent on both surfaces, thinly above, more densely beneath, strongly nerved when fully mature; petiolule very short. *Panicles* mostly axillary, 1-2 in. long, sessile with corymbose rusty-pubescent branches, dense; flowers with very short pedicels, buds rusty tomentose; bracts and bracteoles broad-ovate or suborbicular, very small, tomentose. *Calyx* with a pair of bracteoles at the base, .1-1.2 in. long, campanulate, rusty downy; petals and stamens inserted below the middle of the calyx tube; teeth ovate, obtuse or subacute. *Corolla* white, .25-.3 in. long; petals all clawed; blade of standard orbicular with a small callosity at the base, somewhat abruptly bent from the claw; claw broader and thicker

than those of other petals; wings broader and keel auricled with long slender claws. *Stamens* 9 or 10, monadelphous. *Pod* 1.5-2.5 by .3-.6 in., strap-shaped, very thin, shining brown, glabrous, finely lineolate, somewhat more closely nerved over the seed or seeds.

Fairly common in the plains and up to 3,000 ft. in the Hills throughout the province.

The bark is often chewed with pan leaves in SOUTH LAKHIMPUR.

Flrs. 1-3. Fr. 9-12.

**10. *Dalbergia mimosoides* Franch. Vern. *Dumi-tum*, Garo.**

A large woody climber; branchlets blackish, lenticelled, glabrous, often hooked to function as tendrils. *Leaves* 3-5 in. long; common petiole slender, glabrous. *Leaflets* 25-33, .4-.6 by .15-.2 in., oblong, sub-cuneate, not oblique at the base, emarginate, membranous, glabrous or nearly so, pale beneath, very finely lineolate underneath; petiolules .05-.1 in. long, filiform. *Panicles* axillary, 1-2 in. long, rather lax; ramifications minutely puberulous; pedicels about .1 in. long. *Calyx* campanulate, very small; teeth small, rounded or subacute. *Corolla* not seen. *Stamens* 9, monadelphous. *Pod* 1.2-2 by .2-.25 in., very thin, flexible, glabrous, 1-3 seeded. *Seeds* straw-colour, .25-.15 in.; testa thin and papery.

KHASI and NORTH CACHAR HILLS also LAKHIMPUR along the foot of the NAGA HILLS.

Flrs. 3-4 (?) Fr. 12-1.

**11. *Dalbergia Thomsoni* Benth. Vern. *Bon-subai-doukha*, Cach.; *Subin-rikang*, Mik.**

A large woody climber, glabrous throughout; bark not rough; branchlets lenticelled, often cirrhose. *Leaves* 4-6 in. long; common petiole terete. *Leaflets* often subopposite, 9-15, .5-1.2 by .3-.7 in., oblong-obovate or elliptic, emarginate, more or less cuneate at the base, chartaceous, glabrous, green on both surfaces, elegantly veined underneath; petiolules about .1 in. long. *Panicles* axillary or terminal with ascending branches and scorpioid branchlets. *Flowers* very small, falling off early. *Calyx* very slightly pubescent.

*Pod* 2·3·5 by ·7·1 in., thin but firm; base cuneate, greenish, glabrous, thickened and veined over the solitary seed; stipe usually ·3·5 in. long.

KHASI and NORTH CACHAR HILLS, apparently not very common.

Flrs. 4-5. Fr. 12-1.

**12. *Dalbergia volubilis* Roxb.** Vern. *Budu-galwang*, Garo.

A large woody climber with deeply fluted ash-coloured stem; branchlets often functioning as tendrils. *Blaze* white, turning to reddish-brown. *Leaves* 4-7 in. long; common petiole terete, glabrous or puberulous. *Leaflets* 9-13, 1-2 by ·5·1·2 in., obovate, cuneate; apex obtuse, truncate or emarginate, glabrous and green above, very thinly adpressed pubescent and somewhat pale beneath; main lateral nerves numerous, slender, oblique, straight; tertiaries finely reticulate; petiolules about ·1 in. long, slender, thinly pubescent. *Panicles* terminal and axillary, copious, densely rusty pubescent; main branches up to 5 in. long, with dense often recurved corymbose branches, ultimate ramifications secund. *Pedicels* very short. *Bracts* ovate or spatulate; bracteoles oblong-obtuse, both very small and densely pubescent. *Calyx* about ·1 in. long, velvety outside with a pair of bracteoles at the base, upper 2 lobes, obtuse and lower three more or less pointed. *Corolla* ·2·25 in. long, bluish white or light mauve; petals all clawed; standard orbicular, somewhat abruptly bent from the claw, with a swelling at the base, claw thicker than those of other petals; keel petals slightly connate. *Stamens* diadelphous in 2 bundles of 5 each. *Pod* 1·5-2·5 by ·7·1 in., thin, flexible, glabrous, light greenish yellow, usually 1-seeded, somewhat thickened over the thin dark-brown seed.

In deciduous types of forests in GOALPARA, GARO HILLS, SYLHET, KHASI JAINTIA HILLS; probably in similar forests elsewhere.

Flrs. 12-3. Fr. from January onward.

**13. *Dalbergia stipulacea* Roxb.** Vern. *Dat-bijla* or *Bijuli*, Ass.; *Garo-deosal*, Mech; *Phalwang*, *Khot-budu*, Garo;

*Sabima-rikang*, *Chamangpe-sude-arong*, Mik.; *Dieng-mei-soh-khwang*, *Dieng-khuruang*, *Mei-phyrwang*, *Dieng-soh-jeruan*, Khasi; *Ching-ching-dit*, Lush.

A large climbing shrub, often a small erect tree or bush; old stems fluted, greyish brown outside. *Leaves* 5-9 in. long; common petiole terete, slender, glabrous, supported by a pair of ovate falcate stipules, about .1 in. long. *Leaflets* 17-25, .8-1.5 by .3-.5 in., oblong, cuneate and slightly oblique at the base, emarginate, membranous or somewhat firm when mature, green and glabrous above, subglaucous and minutely and sparsely hairy beneath; lateral nerves about 15 on either half, slender, irregular. *Panicles* axillary, 3-5 in. long with ascending more or less secund, racemose branches; flowers rather distant, supported by persistent, large bracts and bracteoles; pedicels .2 in. long. *Calyx* about .15 in. long; lowest tooth linear and longer than the others. *Corolla* reddish-purple, .25-.3 in. long. *Stamens* diadelphous in two sheaths of 5 each. *Pod* 2-4 by 1-1.2 in., pendulous, thin, flat, dark-green, ripening to deep brown oblong, more or less obtuse, generally 1-seeded, thickened and rugose over the seed; stipe .5-.6 in. long, slender. *Seed* .7-.9 in. across, flat; testa brown.

Throughout the plains of the Province, very common in the GARO HILLS.

The stem is woody enough to be used as small posts and tool handles.

Fls. 3-4. Fr. 11-12, often remaining till March.

**D. foliacea** Wall. An erect tree; young parts pubescent. *Leaf rachis* straight, 3-5-5 in. long. *Leaflets* 9-13, rarely fewer, 2-3 by .5-1.1 in., elongate-oblong or oblong-lanceolate, sub-acute, obtuse or acute, often minutely cuspidate, rigidly sub-coriaceous, thinly pubescent on the nerves when young, glabrescent with age; lateral nerves not prominent, about 10-13 pairs; petiolules .1 in. long. *Flowers* white, fragrant, about .22 in. long in corymbosely branched pubescent panicles at the base, sometimes also from upper leaf axils. *Bracts* and *bracteoles* very small, oblong, ciliate, the latter opposite. *Calyx* about .12 in. long, the lowest tooth longest and sharply acute, others obtuse to sub-acute. *Corolla* about .2 in. long; standard short clawed, about .17 in. long, oblong-obovate, other petals with long claws. *Stamens* 9, rarely 10, united in a sheath slit at the top. *Ovary* on a pubescent stipe. *Pod* not seen, according to Baker in F. B. I. "just like that of *D. rimosa*."

Grown in Govt. Park grounds Shillong; no indigenous specimen collected.

Flrs. 5.

### 36. PONGAMIA Vent.

**Pongamia glabra** Vent. Vern. *Naktamala*, Sans.; *Karana*, Sans. & Beng.; *Karchaw*, *Karach*, *Karcha*, Ass.; *Hedem*, Mik. (?).

A small or middle-sized tree with a short trunk and spreading crown, evergreen or leafless only for a short time in March or April, bark grey or blackish and rough outside, green below the cork; blaze soft, light-brown and yellow, .2-.3 in. thick, fœtid smelling. *Leaves* 6-10 in. long, imparipinnate; common petiole terete, slender; stipules caducous, small, oblong, obtuse. *Leaflets* opposite, rarely alternate,\* 5-7, 2-4 by 1.2-.3 in., ovate elliptic, acuminate, subcuneate or rounded at the base, chartaceous, glabrous, dark-green above, pale underneath; petiolules .25-.3 in. long. *Racemes* axillary, simple, peduncled, 3-6 in. long; pedicels .2-.3 in. long, in fascicles of 2-4, pubescent, with a pair of minute bracteoles in the middle. *Calyx* small, subtruncate. *Corolla* .5 in. long, white and purple; petals cohering by the tips; standard broad, appendiculate at the base, shortly clawed; wings slightly adhering to the keel, silky outside. *Stamens* monadelphous; the upper stamen being only partially free; anthers versatile. *Ovary* subsessile, 2-ovuled; style incurved; stigma small, terminal. *Pod* 1.5-2 by 1-1.2 in., woody, flattened, oblong, indehiscent, much thickened at the sutures, not winged, 1- rarely 2-seeded, tipped with the remains of the style. *Seeds* reniform, white streaked with brown, oily.

Occurs in all districts in both valleys except perhaps LAKHIMPUR, often planted along road-sides for shade.

The leaves are good fodder for cows and have valuable medicinal properties. The seeds yield an orange coloured thick oil which is used for illuminating purposes in CHOTA NAGPUR and S. INDIA and is good for many kinds of skin diseases. The wood is yellowish, moderately hard, coarse but even grained, not durable, weighing about 40 lbs. per c. ft.

Flrs. 5-6. Fr. 12-2.

\* *Vide* Mr. Sen Gupta's specimen collected from SYLHET and numbered 7691 in my Herbarium.

## 37. DERRIS Lour.

Usually climbers, rarely trees. *Leaves* imparipinnate, usually exstipellate. *Leaflets* opposite, exstipellate. *Flowers* usually fascicled on the branches of axillary or terminal racemes or panicles; bracts and bracteoles small and usually caducous. *Calyx* campanulate, truncate or minutely toothed. *Corolla* much exserted; standard broad, not auricled; wings long-clawed, often spurred, more or less adnate to the obtuse keel. *Stamens* usually monadelphous; anthers versatile. *Ovary* sessile or subsessile, few-ovuled. *Pod* indehiscent, usually thin, winged down the upper or both sutures. *Seeds* 1 or few, reniform or orbicular.

- I. A middle-sized tree. Leaflets up to 25.  
Pod strap-shaped, winged along the upper  
suture only. . . . .

1. *D. robusta*.

## II. Woody climbers :—

## A. Branches and leaflets glabrous :—

Leaflets 3-5. Racemes short, simple  
or with short basal branches.  
Pedicels fascicled. Flowers reddish-  
purple. Pod less than twice as long  
as broad, upper suture winged. .

2. *D. uliginosa*.

Leaflets 5-7. Racemes panicle.  
Pedicels solitary. Flowers light red.  
Pod about 3 times as long as broad,  
winged along both sutures. . .

3. *D. marginata*.

Leaflets 5-9. Panicles with spread-  
ing branches. Flowers white. Pod  
about twice as long as broad, winged  
on both sutures. . . . .

4. *D. thyrsiflora*.

## B. Branches and leaflets more or less pubescent. Corolla red :—

## 1. Racemes short, usually with short branches at the nodes :—

Leaflets 5-11. Pod 4-5 times  
as long as broad. Upper  
suture winged. . . . .

5. *D. cuneifolia*.

Leaflets 9-13. Pod about 3  
times as long as broad.  
Upper suture winged. . . . .

6. *D. elliptica*.

## 2. Racemes panicle :—

Leaflets 5-9. Pod 2-3 times  
as long as broad. Both  
sutures winged. . . . .

7. *D. ferruginea*.



- C. Branches prominently lenticelled :—  
 Leaflets 7-9, green beneath. Panicles  
 much branched. Pedicels not fasci-  
 cled. Flowers white. Pod winged  
 along both sutures. . . . . 8. *D. Wallichii*.  
 Leaflets 9-11, glaucous beneath.  
 Panicles short, usually fascicled.  
 Flowers bluish. Pod winged along  
 both sutures. . . . . 9. *D. monticola*.

1. **Derris robusta** Benth. Vern. *Kothia-koroi*, *Mouhita*, *Hitkura*, *Sirkhu*, Ass.; *Diengthing*, *Diengphullot*, *Dieng-banthen*, Khasi; *Bon-narje*, *Bon-subai*, Mech; *Bon-subai-phang*, *Murki-mora*, Cach.; *Thing-kha*, Lush.; *Aleng-* or *Aling-thing*, Kuki; *Theng-sak-arong*, *Theng-saksu*, *theng-chak*, Mik.; *Bol-kakharu*, *Bol-tara*, Garo; *Ileng-kung*, *Horuth-ching*, *Kho*, Manip.; *Karanch*, Nep.

A middle-sized deciduous tree with an oval crown. *Bark* greyish white, fairly plain, coarsely fibrous, very light, dun-brown inside with occasional broad streaks of white with rather an unpleasant smell. *Leaves* 5-8 in. long; common petiole slender, channelled above, minutely pubescent. *Leaflets* 5-1.7 by .3-.7 in., oblong or elliptic, subacute, minutely mucronate, thinly coriaceous, green and glabrescent above, minutely silky pubescent beneath; main lateral nerves 5-6 on either half; nervules very closely reticulate; base unequal; petiolules upto .1 in. long. *Racemes* axillary, 5-10 in. long. *Flowers* white, fascicled on slender grey-downy pedicels, .2-.3 in. long. *Calyx* .1-.15 in. long, broadly campanulate, subequally deltoid-toothed, brick-red outside, pubescent with golden hairs. *Corolla* .3-.5 in. long; standard erect, orbicular, emarginate, faintly parallel veined with a faint yellow blotch above the .1 in. long claw; wings .25 in. long, clawed; keel-petals sub-falcate about .3 in. long. *Stamens* often diadelphous. *Ovary* canescent; style incurved. *Pod* 1.2-5 by .35-.5 in., 1-5 seeded, narrowed to both ends, glabrous, reticulate, winged along the upper suture. *Seeds* brown, about .1 in. across, orbicular, compressed.

Common throughout the plains of all DISTRICTS in the PROVINCE and up to 2,500 ft., in the HILLS.

Wood hard of a light-brown colour, no distinct heartwood, used

for house-posts and ploughs, weighing about 50 lbs. per c. ft. The leaves are lopped for fodder. The tree is much planted as a fertilizer in tea-gardens.

Flrs. 4-5. Fr. 11-12.

## 2. *Derris uliginosa* Benth.

A large climber with glabrous branchlets marked with large white lenticels. *Leaves* 6-10 in. long; common petiole terete, puberulous, stout. *Leaflets* 3-5, 2-4 in. long, oblong or oblanceolate, or oblong, usually bluntly short acuminate or subobtusate at apex, coriaceous, glabrous but often pubescent along the nerves beneath; lateral nerves 5-7 on either half, oblique, fairly straight, prominent beneath, depressed above; petiolules .1-.12 in. long, stout and stiff. *Racemes* axillary, short-peduncled, 3-6 in. long, generally unbranched; pedicels fascicled, short. *Calyx* about .1 in. long, campanulate; teeth obscure. *Corolla* about .4 in. long, reddish-purple. *Pod* 1.2-5 by .7-.9 in., oblong, 1-2 seeded, flat but rigid, glabrous or thinly pubescent, prominently veined, thickened at the sutures, sharply winged along the upper suture.

Apparently not very common. Grows in swampy places in certain parts of the SIBSAGAR DISTRICT, e.g., Tengapukhri.

Flrs. 4-5. Fr. 8-10.

## 3. *Derris marginata* Benth. Vern. *Mei-indroh*, *Mei-soh-phlang*, Khasi.

A powerful evergreen climber with dextrorsely twining thickly lenticelled branches. *Leaves* 6-10 in. long, 5-7 foliolate, glabrous throughout. *Leaflets* 3-7 in. long by 1-2 in., oblong, lanceolate or elliptic oblong, long acuminate, more or less rounded at the base, thinly coriaceous, shining above, pale beneath; main lateral nerves 10-12 on either half with many fainter ones between; tertiary veins closely reticulate; petiolule .2-.4 in. long. *Racemes* paniced with several slender lax-flowered branches; pedicels filiform, bracteate, .5 in. long. *Calyx* small, broader than long. *Corolla* pale-red, about .5 in. long. *Pod* 4-6 by 1.5-1.7 in., oblong or oblong-lanceolate in outline, narrowed at both ends, thin and flexible, finely veined, 1-2 seeded, broadly winged along both sutures.

SUB-HIMALAYAN TRACTS in KAMRUP, e.g., Doimara and southern slopes of the KHASI HILLS, e.g., Nongkla, etc.

The inner wood is hard and tough and might be utilized in bent-wood industry.

Flrs. Rainy season. Fr. 12-1.

**4. *Derris thyrsiflora* Benth.** Vern. *Thebu-rikang* or *Thepu-rikang*, Mik.; *Rumaiji-doukha*, Cach.

A large woody climber; bark rough and grey outside, yellow inside. *Leaves* 9-12 in. long, glabrous throughout. *Leaflets* 5-9, 2-6 by .9-2 in. long, elliptic to oblong-lanceolate, abruptly bluntly acuminate, quite entire, rounded or cuneate at the base, coriaceous, pale beneath; main lateral nerves 5-7 on either half, slender, arched. *Panicles* terminal, up to a foot long, with numerous ascending racemose branches with pubescent rachis; pedicels short, not fascicled. *Calyx* about .12 in. long. *Corolla* whitish, about .5 in. long. *Pod* 1-5-3 by .7-1-2 in., glabrous, veined, 1-3 seeded, with narrow wings of uniform width on both sutures.

NORTH CACHAR HILLS, e.g., Panimur, banks of the Daiung river, etc.

Flrs. 8-9. Fr. 12-1.

**5. *Derris cuneifolia* Benth.**

A large climber with tomentose extremities while young; old stem warted. *Leaves* 6-12 in. long. *Leaflets* 5-9, rarely up to 11, variable in size, usually 3-5 in. long, but sometimes attain 7-5 in. or may be only 1-5 in. long, sometimes alternate, obovate-oblong, or elliptic-oblong, usually bluntly short acuminate, cuneate or narrowed, sometimes rounded at the base, entire, subcoriaceous, pale underneath; main lateral nerves 5-6 on either half, very faint; petiolules short. *Racemes* axillary, sometimes fascicled, often .2 in. long, slender, pubescent. *Calyx* about .12 in. long, campanulate, shortly toothed or sub-truncate, densely brown ciliate. *Corolla* about .5 in. long, red or purple, fading to white. *Pod* obliquely elliptic-obovate or oblong, 1-1-5 by 1 in. long, turgid, generally 1-seeded, with a narrow but sharp wing along the lower suture.

Evergreen forests in UPPER ASSAM, e.g., Gaurisagar in SIBSAGAR, at Jhalukbari in KAMRUP, also in SYLHET and CACHAR and southern slopes of the K & J HILLS.

Flrs. 4-5. Fr. 11-12.

**6. *Derris elliptica* Benth.** Vern. *Bakal-bih*, *Mokoi-sopa*, *Etam-chali*, Ass.; *Hiru-alu*, Mik.

A large woody dextrorse climber with long switchy velvety branches. *Leaves* 9-15 in. long, long-petioled. *Leaflets* 9-13, 2.5-6 by 1.2 in., oblong, obovate-oblong, sub-acute, or abruptly and often bluntly short acuminate, minutely mucronate, firmly chartaceous, glabrous above, softly pubescent beneath; lateral nerves 6-7 on either half, oblique, slightly arched, impressed above; petiolules .15-.2 in. long, stout, brown-pubescent. *Racemes* terminal or from upper axils, 3.5-10 in. long with short branches from the nodes and sometimes with long branches from near the base, lax-flowered; rachis and branches brown-pubescent. *Calyx* .15-.2 in. long, oblique, short toothed, pubescent outside. *Corolla* red or whitish, .6-.7 in. long; standard silky on the back. *Stamens* monadelphous, but upper nearly free except in the middle. *Pod* 1.5-3 by .7-1.2 in., 1-3 seeded, rigid, reticulate, but with raised sutures, with a narrow wing along the upper suture, glabrescent.

Throughout the plains of Assam, generally in grass-lands and glades.

The roots are used to poison fish and the bark is chewed with betel leaves.

The roots contain a large percentage of rotenone which is known to be a valuable insecticide. There is a growing demand for the roots on this account in Europe for agricultural insecticides and for sheep ointment. The fibres are made into coarse ropes.

Flrs. 3-4. Fr. 3-6.

**7. *Derris ferruginea* Benth.** Vern. *Ruphang-doukha*, Cach.; *Aru*, Tipp.

A woody climber with blackish-brown bark which exudes a watery sap; young parts ferruginous pubescent. *Leaves* 7-10 in. long; long petioled. *Leaflets* 5-9, 2.5 by 1.2-2 in., elliptic or obovate-oblong, usually abruptly but bluntly acuminate, round at the base, subcoriaceous, glabrous

above, softly ferruginous pubescent beneath, specially along the raised veins; lateral nerves 6-7 on either half, arched, impressed above; petiolules  $\cdot 15\text{--}\cdot 25$  in. long, stout. *Racemes* axillary, more or less paniced, 8-12 in. long with flowers fascicled at the nodes on filiform pedicles,  $\cdot 3\text{--}\cdot 5$  in. long. *Calyx* broadly campanulate,  $\cdot 1\text{--}\cdot 12$  in. deep, pubescent outside. *Corolla*  $\cdot 5$  in. long, reddish white or red; standard glabrescent or thinly pubescent along the nerves on the back near the top; stamens monadelphous; upper stamens free. *Pod*  $1\cdot 5\text{--}3$  by  $\cdot 8\text{--}\cdot 12$  in., flat, strongly veined, densely brown silky when young, thinly hairy or glabrescent with age, 1-3 seeded, with a narrow wing along the much thickened upper surface; lower suture with a sharp edge or very imperceptibly winged.

Evergreen forests in UPPER ASSAM down to DARRANG and SIBSAGAR, e.g., Charduar, Dikhumukh, Kalioni, etc.

Fls. 4-5. Fr. 6-11.

**8. *Derris Wallichii*** Prain in Journ. Ass. Soc. Beng. Vol. LXVI, pp. 99, 462.

A large subarborescent climber with densely lenticelled brown stem and branches. *Leaves* 10-15 in. long; common petiole terete, glabrous. *Leaflets* generally 7, 3-6 by  $2\cdot 2\text{--}5$  in., oblong-lanceolate, lateral somewhat oblique at the base, sub-acute, coriaceous, glabrous; main lateral nerves 5-6 on either half, arched; tertiaries strongly reticulate; petiolules  $\cdot 2\text{--}\cdot 3$  in. long. *Panicle* terminal, 8-12 in. long, with ascending racemose branches, 3-5 in. long. *Flowers* white, not fascicled; pedicels  $\cdot 15\text{--}\cdot 2$  in. long, pubescent. *Calyx* broadly obconical, sub-truncate, slightly pubescent. *Corolla*  $\cdot 6\text{--}\cdot 8$  in. long; standard glabrous. *Stamens* diadelphous. *Ovary* rusty pubescent. *Pods* winged along both the sutures, mature not seen.

Near Haflong in the NORTH CACHAR HILLS, apparently not very common.

Fls. 4-5. Fr. 7-10 ?

**9. *Derris monticola*** Prain. in Journ. Ass. Soc. Beng. Vol. 66, pp. 361 and 463.

A climber; stem verrucose with prominent lenticels;

innovations rusty tomentose. *Leaves* 6-9 in. long; common petiole grooved above, glabrous; stipules ovate-obtuse, adnate, rusty pubescent, up to .1 in. long. *Leaflets* 7-11, 2.5-4 by 1.1-1.5 in., oblong-oblancheolate or oblanceolate, shortly acuminate, cuneate or slightly rounded at the base, chartaceous, glabrous and shining above, glabrescent with age and pale beneath; lateral nerves 6-8 on either half, slender, slightly arched, nervules finely reticulate, but rather indistinct. *Flowers* blue, pale lilac or purple in fascicles on compact racemes; rachis pubescent when young, 2.5-7 in. long; bracts caducous, ovate, small; bracteoles narrower, both densely-pubescent. *Calyx* about .15 in., brown, pubescent; teeth subdeltoid; standard suborbicular, clawed with a green centre. *Stamens* monadelphous, upper nearly free at the base and towards the top. *Pods* winged along both sutures

KHASI HILLS above 5,000 ft., e.g., Saitshyllah near Nongkersin, Gunner falls etc.

Fls. 3-4.

***Derriis scandens* Benth.** A large woody climber with lenticellate branches; young parts rusty pubescent. *Leaves* imparipinnate; rachis 2.5-6 in. long, channelled, glabrescent with age. *Leaflets* 7-11, .9-3 in. by .5-1.4 in., oblong or obovate-oblong, apex often tapering, obtuse, subcoriaceous, glabrous above, puberulous beneath; secondary nerves somewhat obscure, 6-8 on either half; petiolule .1-1.5 in. long, slender, pubescent. *Flowers* white or pink, .25-.3 in. long in fascicles on long axillary and terminal rusty pubescent racemes, up to 12 in. long, often branched; pedicels up to .2 in. long. *Calyx* .1 in. long, truncate, silky pubescent. *Corolla* exserted; standard suborbicular, slightly cordate near the claw. *Stamens* monadelphous; upper stamen half or more, free. *Pod* 2.3 by .4-.5 in., 1-3 seeded, often sinuate between the seeds with a narrow wing on the upper suture.

May be found in LAKHIMPUR, KAMRUP & DARRANG DISTRICTS.

Fls. rainy season. Fr. Cold season.

### 38. DALHOUSIEA Grah.

***Dalhousiea bracteata* Grah.** Vern. *Pahari-lata*, *Tekala-lata*, Ass. (Sih.); *Teli-lat*, Ass. (Darr.); *Paitha-gach*, *Hunkhuri-lewa*, Ass. (Kam.); *Nirong-riubi*, Abor; *Mei-mithai*, *Mei-dieng*, Khasi; *Luyang-thu*, *Angthu-rikang*, *Loi-angthu*, Mik.; *Mishen-doukhka*, *Makhoi-jalla-doukhka*, Cach.; *Nahoi-rang*, Tipp.; *Kali-gauj*, Nep.

An evergrown woody climber with ashy grey bark; young shoots thinly hairy. *Leaves* bifarious, 1-foliolate; stipules 2-3 in. long, ovate or suborbicular ovate, acute, more or less pubescent, many nerved; petiole terete, 5-2.5 in. long, swollen at both extremities. *Leaflets* 3-8 by 2.5 in., ovate-elliptic or oblong-elliptic, quite entire, abruptly bluntly acuminate, rounded or subcordate, sometimes peltate at the base, chartaceous, glabrous, dark-green, shining above, adpressed-pubescent beneath, specially along the nerves when young, ultimately glabrous; main lateral nerves 8-10 on either half; nervules very closely and finely reticulate, (2,000-25,000 meshes per sq. inch); stipules 0. *Peduncles* axillary, solitary, once or twice bifid, each branch terminating in a bracteate flower; bracts about 2-3 in. long, resembling the stipules, in pairs at the joints of the peduncle; bracteoles up to .6 in., similar but larger, also in pairs, concealing the flowers. *Calyx* small, campanulate, hairy outside; teeth very short, deltoid, caducous. *Corolla* white, about .25 in. long, exserted; petals almost sessile; standard orbicular, deeply emarginate, wings oblique; keel-petals slightly incurved, connate along their lower margins. *Stamens* 10; filaments free, subulate, glabrous, all fertile; anthers versatile. *Ovary* subsessile, 2-4 ovuled; style incurved, subulate; stigma terminal, small, capitate. *Pod* 3-4 by 1.2-1.5 in., turgid, compressed, tapering at both ends, coriaceous, 1-3 seeded, continuous and white inside. *Seeds* about 1 in. long, compressed and faceted; testa brown; albumen 0.

Common in evergreen forests of all Districts except GOALPARA and GARO HILLS.

The leaves are excellent as wrappers for country cigarettes known as *biris* and would be well worth creating a demand for in Calcutta and other centres.

Flrs. 5-6 (sometimes a second flush in 10-11). Fr. 12-1.

### 39. SOPHORA Linn.

#### *Sophora acuminata* Benth.

A shrub 6-10 ft. high. *Branches* at first grey-silky, but soon glabrescent and green; young parts adpressed rusty villous. *Leaves* imparipinnate, 6.5-12 in.; rachis and

petiolules rusty pubescent. *Leaflets* 9-19, opposite or sub-opposite, 1.5-4 by .5-1 in., oblong-elliptic, oblong-ovate or lanceolate, finely acuminate, quite entire, chartaceous, glabrous and dark-green above, glaucous and with adpressed silky hairs beneath; midrib prominent and perfectly straight; lateral nerves obscure, about 10-12 on either side of the midrib; lateral petiolules about .07 in. long. *Flowers* about 1 in. long, bright yellow, in axillary peduncled racemes. *Calyx* .2-.3 in. long, oblique, grey silky. *Corolla* much exserted; petals equal in length, long-clawed; standard broad, keel obtuse. *Stamens*\* free or sometimes slightly connate at the base; anthers uniform, versatile. *Ovary* stalked; style incurved. *Pod* 3-5 in. long, 1-4 seeded, distantly moniliform, glabrous, strongly veined and often with a slight metallic lustre; seeds about .35 in. long, oblong, smooth, bright scarlet.

KHASI & JAINTIA HILLS, 3-4,000 ft. e.g. Mawmai, Sutunga, Laitsoh-um, etc.

Fls. rainy season. Fr. 9-12.

#### 40. ORMOSIA Jackson.

***Ormosia robusta* Wight.** Vern. *Porghum*, Miri; *Sanachi* or *Sanachi-bloma*, Garo.

A lofty tree upto 100 ft. in height. *Bark* greenish-grey or brown, rough and longitudinally fissured outside, fibrous and light brown or yellowish inside; young parts and inflorescence tawny or rusty tomentose. *Branchlets* thick, sulcate, prominently lenticelled with age. *Leaves* imparipinnate; rachis 5-12 in long, angled, rusty pubescent, ultimately glabrate; stipules subulate, persistent. *Leaflets* 7-11, opposite, 3-6 by 1-2 in., elliptic-oblong or lanceolate or oblong-lanceolate, entire, acute or shortly, usually bluntly acuminate, rounded or acute at the base, coriaceous, glabrous, dark green above, paler beneath; midrib prominent beneath; main lateral nerves 7-9 on either half, arched; petiolules .15-.25 in. long, stout. *Flowers* in terminal panicles the lower branches of which are from the axils of upper leaves; pedicels upto .2 in. long, enlarging in fruit; bracts .2-.25 in. long, rusty tomentose. *Calyx* persistent, .4-.5 in. long and



about as broad at the mouth, rusty tomentose; lobes subequal. *Petals* dull-white .5-.6 in. long, glabrous, clawed; standard largest, orbicular or slightly broader than long; wing petals obliquely oblong; keel petals obliquely ovate-oblong. *Stamens* 10, free, unequal; anthers versatile. *Ovary* subsessile, villous; style long, filiform, coiled at the end; stigma oblique. *Pod* orange-yellow, 2-4 in. long, 1-2 less often 3-seeded, contracted at the base, dehiscing by both sutures; valves coriaceous, thick, hard when dry. *Seeds* about 1 in. long, oblong, enclosed in a scarlet arillus.

Not common. Nizamghat, NORTH EAST FRONTIER TRACT, Barusali in SIBSAGAR DISTRICT; Lakhipur near CACHAR and SYLHET.

Wood light brown, soft but fairly tough with wavy bands of horny dark tissue. Pores large, scanty; weight roughly 32 lbs. per c. ft.

Flrs. 11-12. Fr. 12-2.

#### Sub-family II. CÆSALPINIOIDÆ. (Legumino-æ).

Trees or shrubs, sometimes climbers, rarely herbs. *Leaves* usually 1 or 2-pinnate, sometimes with only 1 pair of leaflets, sometimes 1 foliolate by the union of these; stipels usually 0. *Flowers* irregular or less often subregular, usually 2-sexual. *Calyx* sometimes spathaceous, often with short tube; lobes 5, less often 4, from the fusion of the upper two, usually imbricate. *Petals* usually 5 or less often fewer or 0, ascending, imbricate, the upper one being innermost in bud. *Stamens* 10, some often reduced to staminodes or aborted, rarely indefinite, usually free. *Ovary* free or united by the stipe to the calyx tube. *Pod* indehiscent or dehiscent, often septate but not breaking into 1-seeded joints. *Seed* various, albuminous or exalbuminous.

#### ARTIFICIAL KEY TO THE CÆSALPINIOIDÆ.

##### I. Leaves bipinnate :—

A. Usually armed woody climbers;  
(in our area). Calyx cleft nearly to  
the base :—

- |                                     |                |
|-------------------------------------|----------------|
| Pod not winged. . . . .             | 1. Cæsalpinia. |
| Pod winged on upper suture. . . . . | 2. Mezoneurum. |

B. Unarmed trees; calyx cleft never  
more than half way down :—

Leaflets 2-4.5 in. long; stamens  
5, equal, pod thin, dry, not

- saponeous, winged on the upper suture. . . . . 3. *Acrocarpus*.  
 Leaflets 7-1 in. long; stamens 10, alternately short and long; pod saponaceous, not winged. . . . . 4. *Gymnocladus*.  
 II. Leaves pinnate, usually paripinnate :—  
 A. Petals 5; stamens unequal, usually 3-5, reduced to staminodes. . . . . 5. *Cassia*.  
     Stamens equal, all perfect, usually 10. . . . . 6. *Cynometra*.  
 B. Petals 3, unequal; stamens monadelphous, only 3 perfect; anthers versatile. . . . . 7. *Tamarindus*.  
 C. Petals 0. Stamens usually 7-8. . . . . 8. *Saraca*.  
 III. Leaves 1-foliolate, usually of 2 connate leaflets. . . . . 9. *Bauhinia*.

### 1. CÆSALPINIA Linn.

Trees, shrubs or climbers, usually prickly. *Leaves* abruptly 2-pinnate. *Flowers* showy, usually yellow, red, rarely white, in axillary or terminal racemes or panicles. *Bracts* present at least when young. *Calyx* deeply 5 cleft; lobes imbricate, lowest largest and concave; tube short, disk-lined. *Petals* spreading, orbicular, clawed, uppermost smaller than the others (ascending imbricate). *Stamens* 10, free, declinate; filaments often villous at the base; anthers oblong, uniform, versatile. *Ovary* few ovuled; style filiform; stigma terminal. *Pod* various in form, dehiscent or not, smooth or prickly.

Pods armed with sharp prickles :

Leaflets large. . . . . 1. *C. crista*.

Pods unarmed, fleshy :—

Leaflets 7-10 pairs on each pinna, less than 4 times as long as broad. . . . . 2. *C. digyna*.

Leaflets 14-23 pairs on each pinna, more than 4 times longer than broad. . . . . 3. *C. microphylla*.

**1. *Cæsalpinia crista* Linn. Syn. *Cæsalpinia Bonducella* Fleming. The fever nut. *Putikaranja*, Sans. Vern. *Lataguti*, Ass. & Kach.; *Kamburu-rikang*, *Ching-sum-arong*, Mik.; *Nata*, Beng.**

A scandent or scrambling prickly shrub; branches downy and armed with more or less straight, fine to strong prickles. *Leaves* 12-18 in. long; stipules large, 2 fid; rachis and its

branches brown pubescent and bearing recurved prickles; stipules foliaceous, pinnatisect; segments obovate. *Leaflets* 6-10 pairs on each pinna, opposite, .7-1.7 by .4-.8 in., oblong or elliptic, subacute or obtuse, mucronate, puberulous on both surfaces, specially beneath, petiolules minute, with a pair of short hooked prickles at the base. *Racemes* 6-12 in. long, supra-axillary and terminal, peduncled, gradually denser towards the top; rachis, bracts, buds and pedicels brown-tomentose; bracts .4-.5 in. long, linear-lanceolate, acuminate, exceeding the buds; pedicels .2-.3 in. long. *Calyx* .2-.3 in. long; lobes obtuse, finely rusty tomentose on both surfaces. *Petals* .4-.5 in. long, yellow, the uppermost and smallest often spotted with red. *Filaments* silky hairy on the lower half. *Pod* 2-3 by 1.5-2 in., coriaceous, dehiscent, thickly beset with sharp wiry prickles, .2-.3 in. long. *Seeds* 2-3; testa very hard, shining, lead-coloured, with numerous very fine horizontal cracks when dry.

N. E. FRONTIER, DARRANG, NOWGONG, CACHAR, SIBSAGAR, probably throughout the province in plains and low elevations.

The nuts and the root bark are considered to be tonic, antiperiodic and febrifuge.

Fls. rainy season. Fr. cold season.

## 2. *Cæsalpinia digyna* Rottler.

A large scandent or straggling shrub armed usually with hooked prickles. *Leaves* 6-12 in. long, rachis and its branches pubescent or glabrescent; pinnæ 8-12 pairs, 1.5-2.7 in. long; leaflets 7-10 pairs on each pinna, .3-.5 in. by .15-.25 in., oblong, glabrescent on both surfaces or minutely adpressed pubescent beneath; apex obtuse or rounded; base oblique; petiolule minute. *Racemes* supra-axillary and terminal, sometimes branched, pubescent when young; bracts nearly obsolete, caducous; pedicels slender, .4-.9 in. *Flowers* bright yellow, .5-.7 in. across. *Calyx* .35 in. long, glabrescent with age; lobes obtuse, lowermost early deciduous. *Petals* orbicular, uppermost reflexed. *Filaments* exerted, lower portion densely wooly. *Pod* 1.3-2.5 by .7-1 in., fleshy, shortly stipitate, crowned by the remains of the style,

1-2 seeded, constricted between the seeds when more than 1-seeded. *Seeds* dark brown, roundish; testa very hard.

CACHAR—Shaik Mokim! probably in other Districts also.

Pods contain as much tannin as *C. cortaria*—the Divi-divi of commerce. It may be therefore worthwhile planting it.

Flrs. 8-10. Fr. 1.

**3. *Cæsalpinia microphylla*** Ham. Syn. *C. cinclidocarpa* Miq. *Dari-chik*, Garo.; *Shunugushim-khashiba*, Kach., *Ling-kai-rek*, *Wok-pin-rung*, Kuki.

A prickly climbing shrub; branchlets pubescent when young, lenticellate later on, prickles recurved, almost horizontal with flattened bases on old stems. *Leaves* 9-15 in. long; rachis with paired recurved prickles, finely downy as also the pinnæ; pinnæ 9-12 pairs, 2-4·75 in. long; leaflets 14-23 pairs, 3-6 by 0·8-1·5 in., sessile, linear-oblong, oblique at the base, subcoriaceous and more or less rigid, glabrous and dark-green above, puberulous beneath. *Racemes* paniced, terminal and axillary, 8-15 in. long, brown pubescent when young. *Flowers* yellow; buds 45 in. long; pedicels 4-7 in. long, puberulous. *Calyx* glabrous outside; lobes 4-5 in. long. *Petals* obovate to suborbicular, about 5 in. long, clawed. *Stamens* villous towards the base. *Pod* fleshy, 2-4·5 in. by 1-1·2 in., 1-3 seeded, constricted between the seeds, seeds black, broadly obovoid, plano convex, about 7 in. long.

LAKHIMPUR, DARRANG, N. CACHAR HILLS, SIBSAGAR, GARO HILLS, GOALPARA—probably in all Districts.

Flrs. 5. Fr. 2-3.

***Cæsalpinia pulcherrima*** Swartz. Syn. *Poinciana pulcherrima* Linn. Vern. *Krishna-chura*, Beng.; Peacock flower; Barbadoes Pride.

A handsome branchy shrub almost unarmed or with few prickles. *Leaves* with 6-9 pairs of pinnæ, rachis 7-11 in. long; leaflets 8-12 pairs, 4-7 in. long, broadly oblong or obovate-oblong, emarginate and mucronate, glabrous. *Flowers* orange or yellow, about 1·5 in. across in elongate terminal and axillary racemes; pedicels articulate near the top up to 2·2 in. long in flower, elongating with age. *Petals* 4, subequal, about 7 in., clawed, crisped, fifth with smaller blade and longer claw. *Pod* compressed.

Sometimes cultivated in gardens in the plains.

Flrs. most of the year except middle of rainy season

## 2. MEZONEURUM Desf.

Armed scandent shrubs. *Leaves* bipinnate; stipules small or 0; stipels 0. *Flowers* yellow in axillary or terminal paniced racemes; bracts narrow, usually deciduous; bracteoles 0. *Calyx* very oblique; the tube short, lobes imbricate, lowest longest, hood-like and outermost in bud. *Petals* 5, 4 spreading, subequal or the uppermost smallest. *Stamens* 10, free, exserted; anthers uniform. *Ovary* sessile or shortly stalked, 2-many ovuled; style filiform; stigma small, capitate. *Pod* quite flat, thin, indehiscent with a broad wing along the upper suture. *Seeds* transverse, compressed, orbicular or reniform.

Leaflets 3-6 pairs, 1.5-3 in. long, pod 1 seeded. 1. *M. cucullatum*.

Leaflets 6-10 pairs, 6-1 in. long, pod 3-6 seeded. 2. *M. enneaphyllum*.

1. *Mezoneurum cucullatum* W & A. Vern. *Baghasora*, *Bagh-anchora*. Ass., *Ghilakata*, (Kam.) Ass.; *Do-jasing-bushu*, *Dudachin*. *Dukhet-thri*, *Jakskil*, *Mingoni-jaksikol-bol*. *Mengo-jakskel*, Garo; *Ling-khang*-, *Lushai*: *Banjotatke*, *Kempnerikom-riubi*. *Insu-tengang*, *Miri*: *Kempu-riubi*, *Abor*; *Paniphigag-taraw*, *Duff*.; *U-sia-lobo-suing*. *Mei-sai-ong*, *Mei-sia-singiong*, *Kh*.; *Kuchai-lot*, *Syl*.; *Sa-musrom*, *Sila-Nasukur*, *Mech*.; *Ingsu-chartel-arong*, *Mik*.

A large straggling scrambling shrub; branches glabrous, covered with blackish hooked prickles which in old stems have thick corky bases. *Bark* thin, yellowish grey outside, light red inside. *Leaf* rachis and its branches armed with hooked prickles, the latter 8-12 in. long; pinnæ 2.7-5.5 in. long, distant, 2-4 pairs; leaflets 1.5-3 by .9-1.2 in., 3-6 pairs, ovate or elliptic to obovate-oblong, bluntly acuminate; base cuneate or rounded, sometimes unequal, glabrous, somewhat glaucous beneath, subcoriaceous; sec. nerves fine, not stronger than tertiaries. *Racemes* terminal and axillary, often from old wood, branched, attaining about the same length as the leaves, usually with few weak prickles; pedicels jointed, .2-.3 in. long. *Calyx* .4 in. long, deeply divided, tube lined with the disk, yellow, lowest lobe much hooded, largest, .3-.5 in. long, obtuse at the apex. *Petals* .25-.3 in. long, bright yellow, upper folded, purplish, deeply 2 lobed. *Stamens*—one exceeding the others and 5 short; filaments with

few hairs near the base; anthers red. *Pod* 3-4 by 1-1.3 in., reddish-brown including the papery wing, which is about .25 in. broad, obliquely oblong, thin, stipitate, 1-seeded.

Throughout the province ascending to about 2000 ft., in the KHASI HILLS.

Fls. 11-2. Fr. 3-4.

**Var. *grandis*** F. B. I. is the robust form of the plant with leaflets up to 4 in. long and 1.6 in. broad and occurs in the same localities.

**2. *Mezoneurum enneaphyllum* W&A.** *Erachora*, *Kochra*, *kaint*, Ass.; *Sujigubung*, Cach.; *Ling-khang*, Lushai; *Hamputo*, Naga; *Ingsu*, *Borplak-asimi*, Mik.; *Rutiasing*, Miri; *Dadu-asing*; Abor.

A scandent glabrous shrub armed with sharp hooked prickles. *Leaf-rachis* 8-12 in. long, armed; *pinnae* 12-20, 2-3 in. long, usually unarmed; leaflets 6-10 pairs, .6-1 by .2-.4 in., oblong or obovate oblong, obtuse at apex; base often unequal, thin, glabrous or nearly so. *Racemes* paniced, attaining 12 in., pubescent when young; pedicels .5-.7 in. long, jointed near the top. *Flowers* about .5 in. across. *Calyx* greenish-yellow, .3 in. long; petals bright yellow; filaments shaggy, unequal. *Pod* 3.5-6 by .9-1.6 in., sometimes 7 by 2.2 in.; wing .3-.6 in., 3-6 seeded.

NOWGONG, SYLHET, LUSHAI HILLS, SIBSAGAR, CACHAR, GOALPARA, probably in all plains forests.

Fls. 9-11. Fr. 12-1.

### 3. ACROCARPUS W & A.

***Acrocarpus fraxinifolius* Wight.** Vern. *Bol-mangal*.? *Silchhal*, Garo; *Thing-rigetot*, Kuki; *Dieng-ji-rep*, Kh.; *Mech-kuri-bol*, Kam.

A tall deciduous unarmed tree, ordinarily attaining about 100 ft. in height and over 10 ft. in girth; stem often buttressed. *Bark* dark-brown or brownish-grey, rough and warty, reddish-brown inside; young shoots and inflorescence reddish brown, tomentose; branches with warty lenticels. *Leaves* bipinnate, *pinnae* 5-7, 6-12 in. long; leaflets 5-8 pairs, 2.4-5 by .75-2.2 in., oblong-ovate or elliptic-lanceolate,

shortly acuminate; base often unequal, ultimately glabrous or nearly so, subcoriaceous; lateral nerves 7-10 on either half; petiolules up to .1 in. long. *Flowers* about 1.2 in. long (including the stamens), dull red or orange, nodding, in dense erect racemes up to about 12 in. long; pedicels short, tomentose. *Calyx* about .4 in. long, campanulate, brown pubescent outside, cleft half way down. *Calyx tube* persistent, at least partly in fruit; segments 5, equal, lanceolate or ovate acute, more or less villous towards the apex outside; disk completely lining the tube. *Petals* 5, slightly imbricate in bud, about .4 in. long, red towards the extremity, greenish towards the base, linear-oblong or oblanceolate-oblong, rusty villous. *Stamens* 5, long exserted, equal; filaments stout, dilated towards the base; anthers uniform, versatile. *Ovary* linear, extruded on a long thinly hairy stipe, the base of which is adnate to the lower end of the calyx tube; ovules many; style incurved, very short; stigma small, terminal. *Pod* 4-5.5 in. long, thin, dark-brown, winged on the upper suture, tapering at the base to the long stalk, which is .5-.7 in. long. *Seeds* up to 18, compressed, .15-.2 in. across.

GOALPARA, GARO HILLS, CACHAR, low elevations in KHASI HILLS, on the slopes above SYLHET, NOWGONG.

Usually branches very high up. Trees upto 200 ft. in height and 150 ft. to the first branch have been recorded from the Madras Presidency.

Sap wood white, heart wood light reddish-brown, pores moderate sized to very large, partitioned, enclosed and joined by wavy lines of soft tissue; medullary rays fine and moderately broad, fairly close. Weight about 39 lbs. per c. ft. (Gamble). It is used in the Darjeeling District for tea boxes and furniture.

Frs. 2-3. Fr. 5.

#### 4. GYMNOCLADUS Lam.

**Gymnocladus assamicus** Kanjilal ms ex Kanjilal, f. sp. Nov. Assam Forest Records Vol. I. p. 7. 8.

A small tree attaining about 40-50 ft. *Bark* reddish brown with an outer reticulating corky layer, living bark thin, yellowish. *Leaves* 2-pinnate, rachis terete, 12-15 in. long, obscurely glandulose, swollen at the base, pinnae 12-14 pairs, opposite or distantly subopposite, 5-9 in. long, slightly channelled. *Leaflets* odd pinnate, 25-27 on each pinna,

minutely petioluled, subopposite to alternate, .75-1 by .25-.4 in., oblong to ovate-oblong, minutely mucronate, nearly glabrous above, minutely brown pubescent beneath on the mid-rib; main lateral nerves 6-8 on either side, very obscure, slightly elevated above, depressed beneath; base rounded to slightly cuneate, often very slightly oblique, petiolules short, sparsely adpressed hairy. *Flowers* .4-.6 in. long in erect, densely grey, shaggy racemes, 4.5-9 in. long; bracts and bracteoles 0. *Calyx* villous outside and also at the throat and along the ribs inside, except towards the base; tube .25-.33 in. long, narrowly funnel shaped; segments 5, subequal, short, .17-.25 in. long, linear lanceolate to subulate. *Corolla* purplish, grey, shaggy throughout; petals 5, .3-.4 in. long—narrowly ovate to liguliform. *Stamens* 10, exserted, alternately shorter, longer opposite the calyx segments; filaments stout, very short, shaggy; anthers oblong, ovoid, 2 celled. *Pod* 5.5-7 by about 1.5 in., 6-8 seeded, compressed, turgid over the seeds, valves fleshy; paricarp polished, mesocarp saponaceous. *Seed* .6-.8 by .5-.66 in., ovoid or subglobose, bluntly trigonous; testa black, horny, extremely hard, radicle erect.

KHASI HILLS about 5000 ft. Laitseh, Maingor—rare.

The Khasis use the fleshy pod- for washing the hair as substitute for soap. Wood hard, yellowish white, weight about 57 lbs. per c. ft.; medullary rays fine, numerous, fairly equidistant. Pores moderate sized in irregular strings of 3-5, joined by lines of soft tissue, annual rings marked by a thin line of soft tissue.

Flrs. 2-3. Fr. cold season next year.

## 5. CASSIA Linn.

Trees, shrubs or herbs. *Leaves* paripinnate, rachis often with glands between the leaflets or at the base; stipules various; stipels 0. *Flowers* often showy, usually yellow, sometimes pink, in racemes, panicles, supra-axillary fascicles or solitary; bracts and bracteoles present. *Calyx* tube very short; lobes 5, imbricate. *Petals* 5, imbricate, subequal or the lower largest. *Stamens* 10, rarely all perfect or equal, 3-5, usually the uppermost wanting or reduced to staminodes; anthers of the three lowermost stamens often longest, all dehiscing by terminal slits or pores. *Ovary* sessile or stalked, linear, many ovuled; style incurved; stigma terminal, usually



truncate, sometimes ciliolate. *Pod* variable, dehiscent or indehiscent, terete or flat, usually septate between the seeds. *Seeds* transverse in the pod, usually compressed, albuminous.

- I. Trees. Stamens 10, all anther bearing; pod woody, indehiscent; leaflets not exceeding 12 pairs :—
  - Flowers yellow in lax racemes; leaflets 4-8 pairs. . . . . 1. *C. Fistula*.
  - Flowers pink in corymbose racemes; leaflets 10-12 pairs. . . . . *C. nodosa*.
- II. Shrubs or tall herbs; stamens 6-7 only fertile; pods not woody dehiscent; leaflets not exceeding 12 pairs :
  - A. Leaf-rachis with one or more glands; valves of pod not winged :—
    1. Leaf rachis with a solitary gland at the base below the lowest pair of leaflets, none between the leaflets :—
      - a. Mature leaves and pods not hirsute; suture of pods more or less thickened :—
        - Leaflets 3-5 pairs, .8-1.2 in. broad, fœtid. . . . . 3. *C. occidentalis*
        - Leaflets 6-12 pairs, .4-.7 in. broad, not fœtid. . . . . 4. *C. Sophera*.
      - b. Mature leaves and pods hirsute; suture of pods not thickened. 5. *C. hirsuta*.
    2. Leaf rachis with glands between the leaflets, none below them :—
      - a. Flowers in pairs on axillary peduncles; pod sub-tetragonous, seeds subcylindric with obliquely truncate ends :—
        - Leaflets obtuse or sub-acute. 6. *C. Tora*.
      - b. Flowers in peduncled racemes; pod turgid, seeds compressed, broadly obovate :—
        - Leaflets under 1.2 in. long, obtuse or rounded at apex. . . 7. *C. bicapsularis*.
        - Leaflets 1.7-3.5 in., cuspidate acuminate at apex. . . . . 8. *C. lævigata*.
  - B. Leaf rachis without any glands, valves of pod with projecting wings along the middle. . . . . 9. *C. alata*.
- III. Diffuse undershrub or herb. Stamens 10, all fertile, unequal; pod thin, strap-shaped, dehiscent. . . . . 10. *C. mimosoides*.

**1. Cassia Fistula** Linn. *Suvarnaka*, *rajataru*. Sans. Vern. *Sonaru*, *Sonari*, *Honalu*, *Honar*, Ass.; *Honar*, *Sonaruarong*, Mik.; *Sonaruphang*, Carh.; *Soneru*, *Sinaru*, Garo; *Raj-brishi*, Nep.; *Sonali*, Beng. The Indian Laburnum.

A medium sized tree with adpressed pubescent young shoots. *Bark* pale or ashy grey, smooth, usually with horizontal wrinkles or cracks up to middle age, thereafter rougher and dark-brown, green below the outer layer, inner substance light-pink, hard. *Leaves* 9-18 in. long, rachis puberulous; stipules minute, pubescent, early deciduous. *Leaflets* 4-8 pairs, opposite, 2-6 by 1-3-3 in., ovate or elliptic-oblong, acute or sometimes short, acuminate; base cuneate or rounded, subcoriaceous, dark-green and shining above, under-surface silvery pubescent when young and puberulous when mature; lateral nerves fine, subparallel, numerous; petiolule .2-.3 in. long. *Flowers* yellow, about 1-5-2-5 in. across in axillary, lax, drooping racemes, 8-24 in. long, pubescent when young; pedicels up to 1-7 in. long, gradually longer towards the base; bracts subulate, up to .2 in. long; bracteoles about .1 in., both caducous. *Calyx* divided nearly to the base, caducous; segments about .3-.4 in. long, elliptic-oblong, obtuse. *Petals* .7-1 in. long, obovate, veined, shortly clawed. *Stamens* 10, three lowest longest with curved filaments about 1 in. long and anthers opening by slits, 4-6 lateral with shorter straight filaments about .4 in. long and anthers opening by pores, the upper 1-3 smallest with indehiscent anthers. *Pod* 1-2 ft. long and about 1 in. across, cylindric, indehiscent, smooth between the seeds. *Seeds* 40-100, about .4 in. across, ovate in outline, flattened, immersed in a dark-brown sweetish pulp.

Almost all over the province ascending to about 2,000 ft. in the K. & J. HILLS.

A very handsome tree when in flower for which it is sometimes grown in gardens. The heartwood is hard and fairly durable. The pulp of the fruit is a powerful purgative. The leafy twigs are good for cattle fodder. The bark is a good tanning material.

Fls. 3-6. Fr. cold season.

**2. Cassia nodosa** Ham. Vern. *Motou*, Cach.; *Bandarlathi*, Cach & Syl. *Chohui*. Manipur; *Khorinu-khodong*, Tipp.

A small to middle sized tree with pubescent shoots. *Bark* grey or dark-brown about .2 in. thick, inside fibrous, light brown with streaks of darker brown, yellowish near the cambium. *Leaves* 8-12 in. long, rachis pubescent or glabrescent; stipules crescent-shaped, cuspidate at the free ends, early deciduous; leaflets 10-12 pairs, 2-4 in. by 1-1.7 in., sometimes attaining 5 by 2 in., lowest usually smaller, oblong, oblong lanceolate or elliptic oblong, shortly and sometimes bluntly acuminate or acute; base often somewhat unequal, subcoriaceous, glabrous above, minutely more or less pubescent beneath, specially along the midrib; main lateral nerves 12-15 on either half, slender but prominent beneath; petiolules up to .2 in. long. *Flowers* pink, 2.5 in. across in corymbose racemes, 5-7 in. from old nodes. *Pedicels* 1.2-2 in. long, pubescent, usually supported by a bract and two bracteoles. *Bracts* subpersistent, lower falcate about .6 in., spurred, upper smaller, obliquely lanceolate-acuminate; bracteoles very small, both pubescent. *Calyx* pubescent, red; segments .2-.25 in. long. *Petals* 1.1-.25 by .3-.5 in., subequal, oblong-obovate, subacute or obtuse with distinct midrib. *Stamens* 10; filaments yellow, 3 longer with globose swellings about the middle and hairy anthers, 4 shorter, bearing spurred anthers opening by basal pores, 3 incurved, bearing apparently sterile anthers. *Ovary* hairy. *Pod* 9-18 in. by .5 in., smooth and similar in appearance to that of the last species but more distinctly transversely ribbed.

Not common, Arunachal, Phulertal, Lower Jiri Reserve, etc., CACHAR, Mahur, Mailongdisa, etc., N. CACHAR HILLS, Singla Reserve, Longai Reserve, etc., SYLHET; probably in other Districts also.

A handsome tree in flower.

Fls. 5-6 and probably throughout the rainy season. Fr. cold season.

**3. *Cassia occidentalis* Linn.** Vern. *Hant-thenga*, Ass. (Kam), *Naguni*, *Jhan-jhani-gach*, Syl.; *Mithep-phang*, Kach.; *Mei-tar-bi*; Kuki; *Hadi-dika-arong*, Mik.; *Taw-eit-niang-thynthai*, Kh.

A foetid soft wooded undershrub or annual attaining 8 ft. in height, innovations pubescent. *Leaf rachis* 5.5-8 in. long, channelled with a gland at the base; stipules about .3 in.

long, obliquely cordate acuminate, caducous; leaflets 4-5 pairs, 1.6-3.2 by .8-1.2 in., ovate to oblong lanceolate, sharply acuminate, margin minutely bristly-ciliate at least when young, membranous, glabrous on both surfaces or slightly pubescent beneath; lateral nerves 8-10 on either half; petiolules very small. *Flowers* yellow, .5-.7 in. across, in few flowered short, axillary or terminal peduncled, corymbose racemes, often forming more or less leafy panicles; pedicels .2-.25 in. long, elongating in fruit; bracts up to .6 in. long, whitish with a tinge of pink, ovate to lanceolate, cuspidate acuminate. *Calyx* segments obtuse, .3 in. long. *Petals* .5 in. long, obovate-oblong with darker coloured veins. *Stamens* 10, the upper 3 reduced to staminodes, the lower three longer and with larger anthers than the others. *Pod* 3-5 in. by .25-.3 in., subfalcate, compressed with transverse depressions between the seeds, sutures thickened. *Seeds* 20-30, compressed, pale brown.

Probably originally introduced from TROPICAL AMERICA but now fairly common in forest glades and waste lands ascending to 3,000 ft. in the KHASI HILLS.

The seeds are said to be used as a substitute for coffee in Africa and Mauritius. The leaves, roots and seeds are medicinal. The plant is also used for skin diseases.

Fls. 7-9. Fr. cold season.

#### 4. *Cassia Sophora* Linn.

An undershrub about 4-5 ft. in height; young parts pubescent. *Leaf rachis* 5-5-10 in. with a conical gland at the base, grooved; leaflets 6-12 pairs, 1.2-2.8 by .4-.7 in., lanceolate or narrow lanceolate, acuminate or acute; base somewhat unequal, glaucous beneath; lateral nerves about 4 on either half, rather obscure; petiolules very short. *Flowers* yellow, 1-1.5 in. across in short, axillary and terminal corymbose racemes, the whole often paniced at the ends of branches; pedicels .2-.3 in. long, pubescent, elongating in fruit; bracts caducous, green, small, ovate, acute. *Calyx segments* .3 in. long, greenish, elliptic or elliptic-ovate, pubescent outside. *Petals* about .5 in. long, obovate or obovate-oblong, yellow with dark veins. *Stamens* 10, 3 or sometimes 4 sterile, lower 3 longest. *Ovary* hirsute. *Pod* 2.5-4.5 in. by .2-.3 in., not

or scarcely depressed between the seeds, somewhat turgid and subterete, sutures more or less thickened.

KAMRUP, SIBSAGAR, KHASI & JAINTIA HILLS, 2,000-3,000 ft. and probably in other Districts also, not common. The leaves, roots and seeds are used medicinally similar to those of the last species.

Flrs. rainy season. Fr. cold season.

### 5. *Cassia hirsuta* Linn.

An annual or an undershrub about 4 ft. in height, all parts hirsute with dense spreading hairs. *Leaf rachis* 4-6 in. long with a solitary gland at the base; stipules subulate, .4-.6 in. long; leaflets 3-5 pairs, 1.2-5 by .5-.3 in., lower gradually smaller, ovate to oblong-lanceolate, acuminate; base unequal; petiolules very small. *Flowers* few together, .75 in. across on short peduncles, which are borne on upper leaf axils or are crowded at the ends of shoots. *Calyx segments* about .25 in. long, densely villous. *Petals* yellow, .3 in. long, oblong-obovate, obtuse, pubescent outside. *Stamens* 6-7, fertile, 2 longer than the others, 3-4 reduced to staminodes. *Ovary* densely villous. *Pods* hirsute, 3-6 in. long, slender, flattened; seeds broadly ovate.

A native of Tropical America, now naturalized in several parts of our area, e.g., KAMRUP, NOWGONG, DARRANG, probably in other Districts also.

Flrs. 10-11.

6. *Cassia Tora* Linn. Vern. *Bon-medelua*, *Dari-diga*, Ass.; *Taw-eit-nyang-synrang*, *Taw-blei*, Kh.; *Hadi-dika-arong*, Mik.

An annual attaining about 4 ft. with pubescent young parts. *Leaf rachis* 1.75-2.5 in., more or less puberulous with two subulate glands between the 2 lowest pair of leaflets, grooved; stipules linear, subulate, .3-.6 in. long; leaflets 3 pairs, gradually decreasing in size downwards 1.2-5 by .4-1.2 in., obovate or obovate-oblong, obtuse or subacute, minutely mucronate; base unequal, thin, glabrescent above, pubescent beneath; main lateral nerves 6-9 on either half; petiolule .1 in. long. *Flowers* yellow, .5 in. across, borne in pairs on very short axillary peduncles, one often abortive;

pedicels  $\cdot 2\cdot 25$  in. long, hirsute. *Calyx segments*  $\cdot 2\cdot 3$  in. long, ovate to elliptic, usually obtuse, ciliate and thinly pubescent in bud, glabrate with age. *Petals*  $\cdot 4\cdot 5$  in., obovate-oblong, prominently veined. *Stamens* 7, perfect, 3 reduced to staminodes. *Pod* 5-8 in. long, sub-tetragonous, imperfectly septate between the seeds; seeds sub-cylindric with obliquely truncate ends.

SIBSAGAR, KHASI and JAINTIA HILLS, KAMRUP, CACHAR, ascending to 2,500 ft. in N. CACHAR HILLS.

Probably all over the Province in waste land.

The leaves and seeds contain chrysophanic acid and are good remedies for skin diseases like ringworm, etc.

Flrs. rainy season. Fr. 11-12.

### 7. *Cassia bicapsularis* Linn. Vern. *Dieng-phareng*, Kh.

A shrub about 4 ft. in height. *Leaf rachis* with one or two glands between the lower pairs of leaflets; stipules early caducous, subulate, small; leaflets 2-4 pairs,  $\cdot 7\cdot 1\cdot 2$  by  $\cdot 4\cdot 7$  in., obovate, obtuse or rounded at the top, glabrous, glaucous beneath, membranous; petiolules very small. *Racemes* peduncled, attaining the size of leaves; pedicels  $\cdot 3\cdot 5$  in. long. *Flowers* yellow. *Calyx segments*  $\cdot 2$  in. long. *Petals*  $\cdot 4$  in. long. *Pod* 3-5 in. by  $\cdot 4\cdot 6$  in., turgid, more or less cylindric, marked with fine horizontal lines.

A native of Tropical America, now run wild in many places in the KHASI HILLS in the vicinity of habitations, Shillong, Shangpung, Sohgympkor, Nongstoin.

### 8. *Cassia lævigata* Wild.

A handsome shrub with glabrous branches. *Leaf-rachis* 4-7 in. long with a gland between each pair of leaflets except the uppermost pair; stipules about  $\cdot 25$  in. long, usually caducous; leaflets 3-5 pairs,  $1\cdot 7\cdot 3\cdot 5$  by  $\cdot 7\cdot 1\cdot 2$  in., lanceolate, cuspidate-acuminate, glabrous, undersurface pale; petiolules minute. *Flowers* yellow, in a few flowered peduncled corymbose racemes,  $1\cdot 5\cdot 3\cdot 7$  in. long; bracts linear, acuminate, up to  $\cdot 2$  in., caducous; pedicels  $\cdot 3\cdot 7$  in. long, glabrous. *Calyx-segments*  $\cdot 2\cdot 3$  in. long, unequal. *Petals* about  $\cdot 5$  in. long, broadly abovate. *Stamens* 7, fertile, 2 longer than

others, 1 intermediate and 4 short; ovary glabrous. *Pod* 2.5-3 by .6 in., cylindric, stipitate at the base, turgid, marked with fine transverse lines. *Seeds* more or less compressed, obovate, about .25 in. long.

Originally introduced from tropical America and now naturalized in KHASI and JAINTIA HILLS, e.g. Borpani, Shillong, Cherrapunji, etc.

In the Khasi Hills specimens a gland is sometimes present between the upper most pair of leaflets.

Flrs. and Fr. almost throughout the year.

**9. *Cassia alata* Linn.** Vern. *Dadulhou*, Kuki & Tipp.; *Daudpata*, Syl.

A soft wooded shrub with thick downy branches. *Leaf-rachis* 9-24 in. long, stout, channelled with slightly margined ridges, but without glands; stipules persistent, about .3 in. long, rigid, deltoid, acuminate with auricled base; leaflets 10-12 pairs, 2-6 by 1-2 in., oblong, obtuse but apiculate with unequal base, subcoriaceous, glabrous on both surfaces or slightly downy beneath; lateral nerves 13-15 on either half, prominent beneath. *Racemes* 6-12 in. long, spiciform, stout, downy; pedicels short; bracts .7-1.2 in. long, prominent, enveloping the buds, caducous, usually obliquely obovate, membranous. *Calyx-segments* .4-.5 in. long. *Petals* bright yellow. .6-.7 in. long, obovate, veined, clawed. *Stamens* 7, fertile 2 longer than others. *Pod* 4-7 in. long, compressed, membranous with a crenulate wing about .4 in. broad along the middle of each valve.

CACHAR—opposite Lakhipur-Barak Reserve, SYLHET—Single Reserve. GOALPARA—Makra, LAKHIMPUR—Jaipur, SIBSAGAR—Barpathar—apparently naturalized.

The leaves as the vernacular names indicate are considered to be good for ring worm.

Flrs. 9-12. Fr. 1-2.

**10. *Cassia mimosoides* Linn.**

Usually a diffuse, sometimes an erect undershrub, attaining 4 ft. often with spreading branches; branches, leaf rachis and inflorescence clothed with adpressed hairs. *Leaf rachis* 2-4 in. long, slender, with a sessile gland close to the

lower pair of leaflets; stipules  $\cdot 25\text{--}\cdot 35$  in. long, subulate with a broad base. *Leaflets* 45-70 pairs, crowded and overlapping,  $\cdot 15\text{--}\cdot 2$  in. long, subfalcately linear oblong, acute, obliquely mucronate, rigid, nerves somewhat prominent beneath, often with a few hairs near the margin on the undersurface. *Flowers* solitary or in pairs; pedicels axillary or extra-axillary, up to 1 in. long; bracts one pair at the base of the pedicels, about  $\cdot 2$  in. long, resembling the stipules; bracteoles 2, a little below the calyx about half the size of the bracts. *Calyx-segments*  $\cdot 15\text{--}\cdot 25$  in. long, unequal, long-ovate, acuminate, thinly pilose outside. *Petals*  $\cdot 2\text{--}\cdot 25$  in. long, yellow, elliptic, obtuse. *Stamens* usually 10, alternately shorter. *Pod* 1.5-2 in. long, strap-shaped with scattered short hairs outside, septas between the seeds, oblique; seeds compressed, obliquely oblong.

KHASI HILLS—Borpani, Umsingkhla, near Nongstein, etc., about 3,000 ft., KAMRUP, probably in most districts.

The flowers are often borne on branches with aborted leaves which give the former appearance of terminal racemes.

The leaflets are sensitive show sleep movements.

## 6. CYNOMETRA Linn.

*Cynometra polyandra* Roxb. Vern. *Ping*, Cach.; *Bonsuthai-buphang*, Kach.; *Chherasu*, Garo; *Dieng-rai-heh*, *Dieng-soh-pyda*, Khasi; *Nanop*, Manip.; *Korhai-ha*, Lushai, Kuki; *Bam-kung*, Tipp.; *Rang-koroi-ching*, *Thing-changleing-theing*, Naga.

A large evergreen tree; stem sometimes buttressed at the base. *Bark* dark-brown or grey, somewhat rough, fibrous, light pink or brownish inside. *Branchlets* lenticellate, shoots enveloped at first in imbricating scales, the lower small up to  $\cdot 3$  in. across, upper membranous and longer. *Leaves* paripinnate, rachis 2.4-5 in. long, puberulous; leaflets 2-3 pairs, sessile, 2.4 by  $\cdot 8\text{--}1.5$  in., lowest pair smallest, obliquely obovate-oblong, oblong-lanceolate or elliptic oblong, obtusely sub-acuminate; base unequally cuneate, inner side with straight margin, on the lower half, narrower than the outer half, subcoriaceous, glabrous on both surfaces; main lateral nerves 7-8 on either half, rather indistinct, meeting in loops near the margin. *Flowers* white, in axillary rusty pubescent



corymbs, 1-2 in. long, floriferous to the base, in bud enclosed by imbricating deciduous, hard, striate, scarious, broadly ovate scales, which are up to .3 in. across and more or less silky pubescent outside; pedicels .6-1 in. long, pubescent, with 2 caducous basal bracteoles up to .2 in. long; buds pubescent. *Calyx tube* very short, with a disk at the base; lobes 4, white, imbricate to obovate-oblong, ultimately reflexed, thinly pubescent outside, .3-.4 in. long. *Petals* 5, linear-oblong to oblanceolate, clawed, about .4-.5 in. long. *Stamens* 40-60, white; filaments slender, glabrous, about .5 in. long. *Ovary* densely wooly, subsessile, very oblique; style filiform; stigma capitate; ovules 1-2. *Pod* 1.5-2.5 in. by .75-1.25 in., falcate or oblique, oblong, woody, usually rather rugose with lenticular dots. *Seeds* solitary.

SYLHET, CACHAR, GARO HILLS, LUSHAI HILLS, KHASI HILLS, low elevations on slopes above SYLHET, Dibrugarh—N. Gill!  
The timber is light red, hard, close grained. It is said to be useful for building and charcoal. Weight about 60 lbs. per c. ft. (G. Mann).

Flrs. 3-4. Fr. 5-6'

## 7. TAMARINDUS Linn.

*Tamarindus indica* Linn. The tamarind tree. *Tintiri*, *Amlika*, Sans. Vern. *Tentul*, Beng.; *Tetuli*, Ass.; *Imli*, Hind.; *Dieng-soh-tantai*, Kh.; *Thei-apai*, Kuki; *Khen-thiri*, Garo.

A large handsome evergreen tree with shallow fissured, dark-grey, rough bark. *Leaves* 2-5 in. long, even pinnate; stipules caducous (persistent in young plants), linear lanceolate. *Leaflets* 10-20 pairs, .4-.7 in. by .15-.2 in., linear-oblong; lateral nerves meeting in a more or less continuous, undulating line close to the margins, slightly notched at the apex, coriaceous, glabrescent; petiolules minute. *Racemes* lax, terminal, few flowered, up to 4 in. long. *Flowers* pale yellow or cream coloured, .5 in. long. *Calyx* segments lanceolate, lowest connate. *Petals* streaked with red, 3 only developed, lower reduced to scales. *Stamens* monadelphous below, only 3 perfect, rest reduced to 3-4 setaceous staminodes. *Ovary* stipitate, stalk adnate to the calyx tube. *Pod* indehiscent, 3-8 by 1 in., usually curved, somewhat compressed, pericarp crustaceous, brittle, scurfy;

seeds dark-brown, smooth, .5 in. across with hard testa imbedded in brown acid pulp, which is traversed by fibres.

Cultivated both for the fruits and as an ornamental tree, all over the province in the plains.

The pulp is largely eaten in curries and chutneys. It is believed to be refrigerent, digestive, carminative and laxative. An adhesive could be made from the seeds which yield considerable quantities of mucilage when steeped in water.

Flrs. 4-6. Fr. cold season.

### 8. SARACA Linn.

**Saraca indica** Linn. Syn. *Jonesia asoca* Roxb. *Ashok* Sans. & Beng. *Ahok*, Ass.; *Biardala* (Bridal plate) Cach.; *Asubuphang*, *Thaibor-phang*, Kach.; *Maikam-par*, Lushai, Kuki; *Bai-kang*, Tipp.; *Bok-bang*, *Khen-thiri*, Garo; *Mir-krem-arong*, Mik.; *Dieng-ja-mar-aih*, *Dieng-soh-kyrkha*. *Dieng-soh-ym-sein*, Khasi.

An umbrageous low branched middle sized handsome tree. *Bark* dark-brown to almost black, rough with lenticels, reddish-brown and fibrous inside. *Leaves* paripinnate, rachis 4-9 in. long, glabrous, leafy almost to the base, pulvinous corky and wrinkled, 4-9 in. long; stipules intrapetiolar, completely united, .35-.5 in. long, scarious, ovate-oblong, obtuse, ciliolate. *Leaflets* 3-6 pairs, 3-10 by 1-2.5 in., oblong-lanceolate to oblong, sub-obtuse to acuminate, coriaceous, glabrous, purplish pink and drooping when young, dark-green above when mature; base slightly unequal; main lateral nerves 8-12 on either half; petiolules short, stout, wrinkled; stipules deciduous. *Flowers* fragrant, orange scarlet, 1-1.5 in. long, in compact glabrous panicles of corymbs from leaf axils or nodes on old wood, rachis coloured; pedicels .3-.5 in. long, red; bracts deciduous, ovate, subacute; bracteoles persistent, 2 at the base of the calyx tube, .15-.2 in. long, spatulate, oblong, ciliolate, amplexicaul, coloured like the calyx. *Calyx* passing from yellowish orange to scarlet, petaloid; tube elongate, cylindric, .5-.75 in. long, crowned by the lobed disk, solid at the base; segments 4, subequal, .3-.4 in. long, obovate, oblong, ciliolate at least when young. *Petals* usually 0. *Stamens* 7-8, much exerted; filaments filiform; anthers

purple, versatile. *Ovary* more or less hairy on the sutures, stipitate, the stipe adnate below to side of the disk, pubescent; style curved, forming a complete ring; ovules many. *Pod* 5-10 by 1.75-2 in., compressed, tapering at both ends, coriaceous, glabrous, veined. *Seeds* 4-8, ellipsoid-oblong, 1.5 in. long, slightly compressed.

SIBSAGAR, NOWGONG, CACHAR, SYLHET, GARO HILLS (planted?) KHASI HILLS, low elevations on the slopes facing SYLHET plains. Planted and sometimes naturalized in UPPER ASSAM.

The wood is used for ploughs and shafts locally. The flowers and bark are medicinal. The former is considered to be an excellent uterine tonic. Fruits are chewed by Mikirs as a substitute for areca nuts.

A very beautiful tree when in flowers. The purplish pink new leaves appear at intervals. In cultivation sometimes few of the stamens are transformed to purple petals. In some forms the leaf-rachis and stipules are puberulous, which thus approach var. *puberula* Prain.

Fls. 2-4. Fl. 9.

*Poinciana regia* Boj. Gold Mohur tree. Vern. *Radhachura*, Beng.

A large soft wooded fast growing handsome tree. *Leaves* large, feathery, 2-pinnate; pinnæ 11-18 pairs; stipules pectinate. *Flowers* gorgeous scarlet and orange; petals 2 in. or more long, orbicular with a long claw. *Pod* 1-2 ft. long.

### 9. BAUHINIA Linn.

Trees or shrubs, erect or climbing by means of circinate tendrils. *Leaf* usually more or less cleft at the apex, rarely of 2 leaflets, palmately veined; stipules various, usually caducous. *Flowers* more or less zygomorphic, in terminal or rarely axillary racemes, or in spreading or corymbose terminal panicles; bracts and bracteoles small, often caducous. *Calyx tube* tubular or turbinate, lined by the disk; limb entire and spathaceous with 5 teeth or cleft into lobes. *Petals* 5, subequal, uppermost petal being innermost. *Stamens* 10, often 5 or more reduced to staminodes; filaments free; anthers versatile, dehiscing longitudinally. *Ovary* stalked, many ovuled, stipe free or adnate to the sides of the calyx tube; style short or filiform. *Pod* linear or oblong, flattened, coriaceous or woody, continuous within or rarely septate, dehiscent or indehiscent. *Seeds* orbicular or ovate, compressed, albuminous.

## I. Fertile stamens 10 :—

Calyx spathaceous; flrs. large; an erect shrub; leaves not acid. . . . .

1. *B. acuminata.*

Calyx of 5 segments; flrs. small; a moderate sized tree; leaves acid. . . . .

2. *B. malabarica.*

## II. Fertile stamens 3 or sometimes 4-5 :—

## A. Erect trees :—

Flrs. when leafless or nearly so; flr. buds not angled; fertile

stamens 5, rarely less. . . . .

3. *B. variegata.*

Flrs. after leaves; flr. buds sharply angled; fertile stamens 3, rarely

more. . . . .

4. *B. purpurea.*

## B. Climbers :—

## 1. Branches not flat or ribbon like :—

a. Mature leaves more or less persistently pubescent at least on the under surface :—

Lobes of leaves obtuse. . . . .

5. *B. VahlII.*

Lobes of leaves acute or acuminate; (pedicels more slender than in *B. VahlII*). . . . .

6. *B. ruja.*

b. Mature leaves quite or nearly glabrous :—

i. Lobes of leaves more or less acute or acuminate :—

Flrs. in corymbs forming terminal panicles; petals hardly exerted; branches cirrhose only at the base; lobes of leaves subacute or bluntly short acuminate. . . . .

7. *B. khasiana.*

Flrs. in simple or branched racemes; petals exerted; branches with many tendrils; lobes of leaves acuminate. . . . .

8. *B. macrostachya.*

ii. Lobes of leaves more or less obtuse :—

Calyx tube about as long as the limb, or slightly longer; petals 1.2-1.5 in. long. . . . .

9. *B. nervosa.*

Calyx tube two to three times the limb; petals .5-.6 in. long. . . . .

10. *B. tenuiflora.*

2. Branches ribbon like, twisted in alternate directions :—

Flrs. very small, in copiously paniced racemes; calyx tube scarcely any.

.. 11. *B. anguina*.

1. *Bauhinia acuminata* Linn. Vern. *Mati-katola*, Ass.; *Gainchhong*, Cach.; *Megong-aphal*, Garo.

An erect shrub attaining about 10 ft.; young parts pubescent. *Leaves* 3-5 in. long, slightly longer than broad, cleft about one-third way down into two acute or subobtusate lobes; base subcordate to nearly truncate, 9-11 nerved, glabrous above, finely pubescent beneath, thinly coriaceous; petiole .7-1.5 in. long, pubescent; stipules subulate with acuminate tip, .3-.6 in. long. *Flowers* white, 2.5 in. across, in short leaf opposed racemes; bracts and bracteoles linear pubescent, the latter .2-.4 in. long, sometimes up to .5 in.; pedicels .5-.8 in. long. *Calyx* 1-1.5 in. long, tube short; limb spatheaceous, acuminate, with setaceous teeth. *Petals* 1-1.75 in. long, elliptic with prominent midrib and ascending veins. *Stamens* 10, fertile. *Ovary* stipitate. *Pod* glabrous, 3-5 by .5-.7 in., beaked, tardily dehiscent. *Seeds* 5-8, flat.

Rani Reserve—KAMRUP, N. CACHAR HILLS, Mupa Valley, GARO HILLS—N. Range, Bhumeswar Hill—GOALPARA. Often cultivated in gardens.

Flrs. 4-5.

2. *Bauhinia malabarica* Roxb. Vern. *Kotra*, Tengkotra, Ass.; *Bakbakhol*, Migong-thak, Garo; *Mugung-la-phang*, *Mugung-glap-gig*, Pakhri, Kach.; *Hanthar*, *Kuthor-arong*, *Hanthar-arong*, Mik.; *Waithur*, Kuki; *Khormang*, Mech; *Dieng-thar-lang-jou*, *Dieng-thar-lang-soh*, Kh.; *Takikural*, *Tangi*, Nep.

A moderate sized tree with bushy crown; bark dark-brown or grey, exfoliating in thin long rectangular flakes, fibrous and red in side, about .75-1 in. thick; young parts pubescent. *Leaves* acid, broader than long, 1.5-4 by 1.8-2.5 in., cleft about a fourth of the way down into two rounded lobes, 7-9, sometimes 11 nerved, cordate subcordate or less often, subtruncate, coriaceous, glabrous above, glaucous and glabrate beneath; petiole .8-1.4 in., swollen

at both ends, rusty pubescent. *Flowers* dull white, .5 in. long. *Racemes* axillary and terminal, 1.5-2.2 in. long, often 2-3 together, sometimes branched from near the base; buds ovoid; pedicels slender, .4-1 in. long, jointed below the calyx, tomentose; bracts and bracteoles minute. *Calyx* brown, tomentose; tube .3-.5 in. long; lobes 5, slightly longer, linear, subulate. *Stamens* 10, alternately longer and shorter. *Ovary* pubescent; style produced. *Pod* 7-14 by .7-1 in. on a stalk 1 in. long, flat, flexible, straight or sub-falcate, beaked, marked when dry with more or less reticulate raised lines, which descend obliquely from the middle of the valves to the sutures. *Seeds* 20-30, ovoid, globose, .2 in. long, dark-brown, polished.

GARO HILLS, KAMRUP, NOWGONG, GOALPARA, N. CACHAR HILLS, KHASI HILLS, up to 2200 ft. Nongpoh, Umhing forest Road etc.; SIBSAGAR.

About 320 seeds weigh 1 oz.

Fls. 8-10. Fr. 1-5.

**3. *Bauhinia variegata*** Linn. *Kanchanai*. Sans. vern. *Tulla*, *Kanchon*, Sylh.; *Bogakatra*, *Kurol*, *Kotora*, Ass.; *Darichiksam*, *Bol-migong*, *Migong*, Garo; *Kolka*, Jharua; *Mukhunglap-baphang*, *Kural-bi-phang*, *Mugam-galap*, Kach.; *Mai-hou-lei*, Manip.; *Chinghau*, Nep.; *Wai-bi*, *Vaibeh*, Kuki; *Inku-arong*, Mik.; *Dieng-tharlong*, *Dienglong*, Khasi; *Baije*, Lushai; *Khormang*, Mech.

A moderate sized tree with dark grey or brown somewhat rough bark; shoots tomentose when young. *Leaves* 2.6-6 in. long, as broad as long or sometimes broader, usually deeply cordate, 11-15, nerved, thinly coriaceous, glabrous and dull green above, grey glaucous and puberulous along the nerves beneath, cleft through about a quarter or third the length; lobes obtuse or rounded; petiole 1.1-5 in. long. *Flowers* large, pure white, pink or purple, 2-3 in. across when fully opened, in few flowered corymbose grey pubescent racemes, from leafless axils or terminating lateral shoots; pedicels very short or 0, stout; bracts and bracteoles very small deltoid. *Calyx* covered with grey and somewhat sticky pubescent tube, .5-1 in. long, slender; limb spathaceous, 5 toothed at the apex, .6-1.2 in. *Petals*

1·5-2 in. long, obovate or obovate-oblong; base clawed, with distinct midrib and ascending veins, glabrous, 4 white and 1 coloured or in 4 pink and 1 deeper purplish-pink or in some—cultivated forms 4 pure white and one with yellowish centre (*B. candida* Roxb.). *Stamens* usually 5, rarely fewer; filaments stout, unequal, incurved. *Ovary* with a long stipe which is extruded ·5-·7 in. beyond and adnate at the bottom to the calyx tube, covered with mealy pubescence and with spreading hairs along the sutures; style short. *Pod* 6-10 by ·7-·9 in., hard, flat, glabrous, prominently veined when dry, slightly falcate, dehiscent. *Seeds* 10-15.

Throughout the Province ascending to 2500 ft. in the KHASI HILLS, more common in hilly country.

The flower buds are curried and eaten, the leaves are good fodder, often cultivated for its handsome flowers.

About 70-100 seeds weigh 1 oz.

Fls. 2-4, when nearly leafless or leafless. Fl. rainy season.

#### 4. *Bauhinia purpurea* Linn. Vern. *Kurial*. Ass.

A moderate sized tree; bark greenish, ashy-grey or dark-brown, somewhat rough on old stems, inside pinkish white with streaks of brown; young parts brown pubescent. *Leaves* 3-6 in. long, rather longer than broad, cleft about third to half way or more down, rather thin but tough, glabrous above, glabrate or minutely puberulous on the nerves beneath; base cordate, less frequently truncate, 9-11 nerved; lobes narrowed towards the apex, acute or sub-acute at the tip, sometimes slightly overlapping on the inner margin; petiole 1-1·6 in. long, swollen at both ends. *Flowers* rose purple in few flowered terminal, corymbose or paniculate brown tomentose racemes; pedicels ·2-·5 in. long, tomentose; buds acutely 5-angled. *Calyx* tomentose; bracts and bracteoles very small, deltoid, tomentose; tube ·3-·4 in. long; limb spathaceous, usually splitting into two segments, nearly twice as long as the tube. *Petals* 1·5-2 in. long, oblanceolate, long clawed, with distinct midrib and veins. *Stamens* usually 3 fertile, slightly shorter than the petals; staminodes unequal. *Ovary* downy with a long stipe. *Pod* 6-10 by ·6-·8 in. on a tomentose stipe, which is ·6-1 in. long, slightly falcate, flat, greenish purple, pubescent along the

sutures, tardily dehiscent. *Seeds* 12-15, flattened, roundish, dark-brown, smooth.

Very ornamental when in flower for which it is sometimes cultivated.

KAMRUP, GOALPARA, LAKHIMPUR, etc.

Heartwood reddish-brown, moderately hard, fairly close grained. suitable for agricultural implements and building where not exposed. The leaves are fair cattle fodder. The bark could be used for tanning.

Flrs. 9-11. •Fr. 1-3.

**5. Bauhinia Vahlia** W. & A. Vern. *Nak-kati-lewa*, Ass.

A gigantic climber, often with irregularly fluted stem showing on cross section irregular masses of xylem tissue, arranged roughly in a floral pattern separated by masses of bark-like tissue. *Branchlets* often ending in a pair of tendrils; young parts, petioles and leaves beneath, specially along the nerves, densely rusty or rarely greyish tomentose. *Leaves* very variable in size, usually 4·5-18 in. across, sometimes smaller, as broad as long or broader, cleft through about a third of the length; lobes obtuse rounded, thin but tough, dark-green and glabrescent above, more or less downy beneath; base deeply cordate, 11-15 nerved; petiole 2·5-6 in. long, swollen at both ends stout; stipules ovate oblong, obtuse, about ·2 in. long. *Flowers* 1·5-2 in. across, white or cream coloured, in terminal woolly corymbs or corymbose racemes; pedicels 1·2-5 in. long, densely tomentose-like the calyx with lanceolate caducous; bracts at the base ·15-·2 in. long, and a pair of small linear and bracteoles above the middle. *Calyx* tube ·2-·3 in. long, slender; limb ·4-·5 in. long, 5 toothed, irregularly splitting into two broadly ovate, reflexed lobes. *Petals* ·8-1·2 in. long, obovate or oblanceolate, silky pubescent outside along the back; margins crisped, glabrous. *Fertile* stamens 3. *Ovary* densely woolly, stipe adnate to calyx tube, densely woolly; style glabrescent towards the apex. *Pod* 5·5-12 by 1·75-3 in., flat, woody, rusty, velvety. *Seeds* 8-12, about 1 in. across.

GOALPARA, KAMRUP, and probably in other forests.



The bark yields a tough fibre which is used for cordage, the leaves are used as plates, the pods are roasted and the seeds eaten.

Flrs. 4-6. Fr. cold season.

**6. *Bauhinia rufa*** Grah. Vern. *Hambiokalik-arong*, *Hambi-okalik-arikang*, Mik.

A large cirrhose climber, climbing tall trees. *Young* shoots, inflorescence, petioles, pedicels and outer surface of calyx densely ferruginous, tomentose, cirrhi axillary, ultimately becoming stout and woody round their supports. *Leaves* 3·7-8·5 by 3·7·5 in. near the inflorescence, incised about a third way down, sinus deltoid; lobes usually with an acute or shortly acuminate rarely sub-acute tip, glabrous when mature above, pubescent atleast along the nerves beneath, thinly coriaceous; base cordate to subtruncate, 9-11 nerved; petiole up to 5·2 in., swollen at both ends; stipules about ·3 in. long, subfalcate. *Flowers* white in terminal corymbose racemes; pedicels 1·1·8 in. long, more slender than in *B. Vahlia*; bracts ·25·35 in. long, linear, acuminate, persistent. *Calyx* tube ·25·3 in. long; limb 3·4 in. long, irregularly split, ultimately reflexed. *Petals* ·7·8 in. long, suborbicular-obovate to broadly spatulate with crisped margins, long clawed, densely silky on the back; fertile stamens about 3. *Ovary* densely silky, shortly stipitate; style long, glabrous. *Pods* not seen.

SIBSAGAR—Borpathar, Jamguri, Kaloni forests, etc., N. E. FRONTIER, Sarpo Valley, LUSHAI HILLS.

Flrs. 4.

**7. *Bauhinia khasiana*** Baker.

A large climber, often deeply fluted; branchlets cirrhose only at the base, angled, coppery silky when young. *Leaves* 3·5-7 by 3·6 in., ovate or suborbicular in outline, cleft about a third or fourth way down into sub-acute or bluntly short acuminate; lobes thinly coriaceous, glabrous, strongly 7-9 nerved, widely cordate or truncate; petiole 1·25-3 in. long, smaller near the inflorescence, glabrescent with age, swollen at both ends. *Flowers* in corymbs 2·5 in. long, several together forming a terminal spreading panicle; the lower branches of which are sometimes form upper leaf

axils, densely covered when young like the pedicels and the calyx with ferruginous silky hairs; bracts .2 in. long, ovate-lanceolate, caducous; pedicels 1-1.5 in. long, slightly dilated upwards. *Flowers* .5 in. across, brownish-red. *Calyx tube* .25-.3 in. long, sub-cylindrical, sharply kneed in open flowers; limb about the same length, irregularly split, rosy inside. *Petals* about .35 in. long, oblanceolate or obovate, densely silky outside with reddish-brown pubescence, sparingly so inside. *Stamens* usually 3 fertile; filaments tapering, glabrous, red. *Ovary* densely pubescent along the sutures, shortly stipitate. *Pod* not seen.

KHASI HILLS, e.g. Um Eu (beyond Barpani), Smtong, Watt!  
Flrs. 7.

***Bauhinia piperifolia* Roxb. Syn. *B. glabrifolia* Baker. in F. B. I. in part. *B. Lucida* Wall.**

A large cirrhose climber; young shoots silky pubescent, tendrils axillary, forked and curled. *Leaves* ovate in general outline, entire at the ends of shoots, cleft along a fifth to a third at apex and the whole way down in young plants and root shoots, chartaceous, glabrous when mature; base broadly cordate to subtruncate, 9-11 nerved, 7-nerved in upper leaves; petiole 1.4 in. long, swollen at both ends. *Flowers* .4-.5 in. across in many short peduncled dense flowered corymbs at the ends of branches, all together forming terminal corymbose panicles; corymbs 2.5-3.5 in. long, brown or grey (?), silky tomentose like the pedicels and calyx. *Bracts* minute, lanceolate, caducous; bracteoles minute, early deciduous; pedicels slender 1-1.2 in., broader upwards. *Calyx tube* about .15-.2 in. long; limb .25 in. long. *Petals* .25-.3 in. long, obovate, clawed, shaggy outside with brown hairs. *Stamens* 3 fertile. *Ovary* glabrous, short stalked style produced. *Pods* not seen, according to Roxburgh round or oval, glabrous, 1-2 seeded.

SYLHET, C. B. Clarke!

**8. *Bauhinia macrostachya* Wall. Vern. *Ram-jakhola*. *Makhori-ghila*, Ass.; *Nagbeli*, Nep.; *Mugung-glap-jola-dukha*, *Jong-rak-kal-hrin-rang*, Kuki.**

A large climber, usually with copious, stalked and 2-forked tendrils. *Leaves* 3-6 in. long, broadly ovate or suborbicular in outline, incised,  $\frac{1}{3}$ th- $\frac{1}{2}$ th way down or upper leaves nearly entire; lobes acuminate, sometimes widely divergent; upper surface glabrous, puberulous along the nerves or glabrescent beneath; base broadly cordate, usually

9 nerved; nerves converging towards the apex; petiole 2-3 in. long, swollen at either end. *Racemes* 3-6 in. long, simple or branched, terminal or from upper axils; bracts small, deltoid like the pedicels and sepals, densely brown pubescent; pedicels .25-.5 in. *Calyx* campanulate; tube .25-.4 in. long, turbinate; limb .25 in. long, 5-cleft to about half way down; segments sub-regular. *Petals* exserted, about .5 in. long, pale yellow, obovate, long clawed, densely brown tomentose. *Fertile stamens* 3. *Ovary* densely ferruginous-woolly, shortly stalked; style short, glabrate towards the apex. *Pod* 4-6 in. by 2 in., flat, indehiscent, persistently tomentose, 2-4 seeded.—Hooker.

N. E. FRONTIER, LAKHIMPUR, CACHAR, NORTH CACHAR HILLS, SIBSAGAR, Garampani, Barpathar, Kankhowa, Merapani, etc., JAINTIA HILLS—Prain's collector!

Flrs. 4-5.

**9. *Bauhinia nervosa* Wall.** Vern. *Mi-jalong*, Khasi; *Hrui-wai-be*, Kuki.

A large cirrhose climber; young shoots pubescent; tendrils in pairs. *Leaves* 3-4.5 by 2-3 in., longer than broad, thinly coriaceous, glabrous above, puberulous along the nerves beneath, lobed less than half way down; lobes sub-obtuse; base 11-15 nerved, subordinate; petiole 1.7 in. long, shorter upwards; stipules .2-.4 in. long, obliquely oblong. *Flowers* white in elongate ferruginous pubescent terminal racemes; bracts and bracteoles spatulate, early deciduous; pedicels 1-2 in. long. *Calyx* pubescent outside; tube cylindrical, about 1 in. long; limb .7-.8 in. long, divided ultimately into oblong acute segments. *Petals* about 1.2-1.5 in. long, long clawed, white, fading to dun-brown, ferruginous, silky. *Fertile stamens* 3. *Ovary* clothed with dense brown or rufous silky pubescence, stipitate; style stout; stigma dilated, capitate. *Pod* 6-8 in. by 1.7-2 in., with thick valves, glabrescent, stipitate and often with a slender beak.

KHASI and JAINTIA HILLS up to 3,000 ft.; CACHAR.

*Bauhinia albo-lutea* Prain. Syn. *Phanera albolutea* Miq. Vern. *Jermei-dieng-long*, Kh.

A climbing shrub; innovations rusty pubescent; tendrils few, glabrescent with age. *Leaves* 2·5-4 in. long, roundish, sometimes broader than long, cleft about  $\frac{1}{2}$  way down; lobes usually subacute, dark green and glabrous above, more or less pubescent or ultimately puberulous beneath; base subtruncate, subcordate, or cordate, 11-13 nerved; petiole 1·5-2·5 in. long, swollen at both ends, puberulous; stipules 2·3 in. long, obovate-oblong or oblong-obtuse. *Flowers* in few flowered lax terminal corymbose rusty pubescent racemes, 3-4 in. long; bracts about 2 in. long, lower broadly ovate, narrower upwards; bracteoles subulate, .15 in. long; pedicels 7-1·5 in. long, rusty puberulous like the calyx; buds .9-1 in. long, clavate. *Calyx* tube 3·45 in. long, dilated downwards to the base; limb 65·75 in. long, splitting into 5 reflexed, oblong-lanceolate lobes. *Petals* 1·25 by .3 in., cream coloured, subequal, oblanceolate, subacute, clawed, pubescent outside along the lower third of the midrib and the claw. *Stamens* 3 fertile. Ovary stipitate, rusty, pubescent; style slender, glabrous. *Pod* not seen, "thin, oblong with black glabrous woody valves"—Prain. *Seeds* 2 (Miquel Flr. Ind. Bat. I, 1079).

KHASI HILLS, Hatmawadan.

Flrs. 9-10.

#### ***Bauhinia Championii* Benth.**

A large climber; young shoots and inflorescence densely pubescent. *Leaves* 2·5-4·5 by 2·3·5 in., cleft  $\frac{1}{4}$ th way down into two obtuse or broadly subacute or bluntly short acuminate lobes, glabrescent above, thinly pubescent beneath; base about 7 nerved; petiole .6-1 in. long. *Flowers* small, white, in elongate and usually branched racemes, which are axillary or terminate branches; bracts minute, early deciduous; pedicels 2·25 in. long, pubescent. *Calyx* pubescent; tube very short; limb about .15 in. long, ultimately reflexed and 5-fid. *Petals* about .2 in. long, clawed. *Stamens* 3 fertile, others rudimentary or absent. Ovary stipitate, glabrous or nearly so. *Pod* 1·75-2·5 in., thin, glabrous, 1-2 seeded with a slender stipe.

Brahmakunda—Masters!

Material incomplete for satisfactory determination.

**10. *Bauhinia tenuiflora* Watt. ex Clarke in Journ. Linn. Soc. XXV. 18. Vern. *Nga-hiamba*, Naga; *Jong-rekal*, Kuki.**

A large cirrhose climber. *Bark* dark or reddish-brown, pinkish inside; shoots and inflorescence clothed with copper coloured hairs when young; tendrils usually forked and axillary at the base of the shoots. *Leaves* 2-4 in. long, usually as broad as or sometimes broader than long, lobed, about  $\frac{1}{4}$ th- $\frac{1}{2}$ th way down, thin, glabrate above, glaucous and often with scattered pubescence along the nerves beneath;

base truncate or broadly subcordate, with 7-9 nerves which end in loops near the margin; petiole 1-1.5 in. long; stipules falcate, .15-.2 in. long, early deciduous. *Flowers* white, in terminal and lateral many flowered corymbs; bracts subulate, .15-.2 in. long; bracteoles 2 on each pedicel, filiform, .1-.15 in. long, lower pedicels attaining 1 in., at first densely afterwards thinly pubescent like the calyx. *Calyx tube* linear, .6-1.2 in. long; limb about a half to a third of the calyx tube, greenish, ultimately reflexed, two of the lobes cohering to near the apex. *Petals* .5-.6 in. long, clawed, obovate or oblong-obovate above the claw, erose with scattered hairs outside. *Fertile stamens* 3. *Ovary* glabrous. *Pod* 5-8 by 1.5-1.75 in., glabrous, very thin, flexible, about 15-20 seeded. *Seeds* flat, about .2 in. across.

N. CACHAR HILLS, Jatinga, Mailongdiss, Haflong, KHASI HILLS, Mairung (?) Nartiang, NAGA HILLS, MANIPUR.

**11. *Bauhinia anguina* Roxb.** Vern. *Nagput*, Sylh.; *Deo-jokhola*, Ass.; *Dukhoi-akhlem*, Kach.; *Kipiadong-kam*, *Tiso-donri-rikang*, *Tiso-adon-arikong*, *Tisodonri*, Mik.; *Zonga-lei-lon*, Lushai; *Mei-lang-rih*, Khasi. "The snake climber."

A large climber, with flat ribbon like stems, twisted to form depressions on alternate sides; branchlets terete; tendrils few. *Leaves* 2.5-6.5 by 2.5 in., broadly ovate, almost entire on old plants, deeply lobed, sometimes almost to the base into acuminate or caudate lobes, in young plants or coppice shoots, chartaceous, glabrous; base broadly cordate, 5-7 nerved; petiole .6-1.5 in. long, glabrous. *Flowers* very small in racemes, 3-5.5 in. long, arranged in terminal panicles, often extending to the axils of upper leaves; pedicels up to .2 in. long, slender, at first pubescent, ultimately puberulous as are the axis of the inflorescence and its branches; bracts minute, subulate; buds globose. *Calyx tube* very short; limb about .07 in., 5-cleft. *Petals* .15 in., obovate, clawed, white, puberulous. *Fertile stamens* 3. *Ovary* stipulate, glabrous; style slender. *Pod* 1.2-1.5 in., indehiscent, obliquely oblong, often ending in a recurved tip, thin, flat, glabrous, 1-2 seeded.

Common. KHASI HILLS; LUSHAI HILLS, Tipaimukh; NOW-GONG, Dhansiri.

The bark is used in rope-making. The most regularly serpentine

pieces of the stems and large branches are carried about by numerous mendicants to keep off serpents.

Fr. 11.

**Sub-family—3. MIMOSAOIDEÆ (Leguminosæ).**

Trees, shrubs or woody climbers, rarely undershrubs or herbs. *Leaves* usually bipinnate, less commonly simply pinnate, sometimes pinnæ and leaflets reduced to one pair. *Flowers* small, regular, generally 5-merous, usually hermaphrodite, sometimes polygamous, usually in heads or spikes, sometimes in racemes or umbels; bracts small; bracteoles very small or 0, usually deciduous. *Calyx* more or less campanulate, truncate or valvately toothed or lobed, sometimes minute. *Petals* valvate, more or less connate into a tubular or funnel shaped corolla or free. *Stamens* as many or twice as many as petals or indefinite, free or monadelphous, sometimes adnate to the base of the corolla. *Ovary* free, 2-many ovuled. *Pod* dehiscent or indehiscent, sometimes many jointed. *Seeds* exalbuminous or albuminous, sometimes arillate.

- I. Stamens definite, usually 8-10 : —
  - A. Flowers spicate; anthers usually with an apical gland, unarmed :—
    - Large climber with immense pod, septate between the seeds; seeds very large, dark reddish-brown. . . . . 1. Entada.
    - Erect tree, valves of pods spirally twisted when dehiscing; seeds scarlet. . . . . 2. Adenanthera.
  - B. Flowers in heads; anthers without apical glands :—
    - Unarmed tree. Pod not breaking up into 1 seeded joints. . . . . 3. Parkia.
    - Prickly shrub or undershrubs. Pod breaking up into 1 seeded joints. . . . . 4. Mimosa.
- II. Stamens indefinite :—
  - A. Stamens free. Armed trees or shrubs. . . . . 5. Acacia.
  - B. Stamens monadelphous :—
    1. Pods dehiscent not septate between the seeds :—
      - Unarmed trees; pod thin, flat, suture not thickened. . . . . 6. Albizzia.
      - Unarmed trees; pods twisted or

- |   |       |                   |
|---|-------|-------------------|
| circinate, unarmed (or sometimes armed in exotic species).                          | ..    | 7. Pithecolobium. |
| Trees or shrubs with weak or strong stipular spines, sutures of pod much thickened. | ..    | 8. Calliandra.    |
| 2. Pods indehiscent, septate between the seeds.                                     | .. .. | 9. Enterolobium.  |

### 1. ENTADA Adans.

**Entada scandens** Benth. Vern. *Gila*, Beng.; *Gila-lewa*, *Bor-ghilla*, *Ghila*, Ass.; *Gilar lot*, Ass. (Cach.); *Chhui*, *Sue-budu*, *Shuri*, Garo; *Gila-lewa*, Mech; *Hambi-arikong*, Mik.; *Ther-kanup*, *Mei-nap*, *Mei-nok*, *Mei-keronath-dom*, Kh.; *Jermei-tang-nop*, *Tille-nop*, Synt.; *Papia-riube*, Miri & Abor; *Koy*, Lushai; *Poy*, Kuki; *Kangthro*, Manip.

An immense woody climber; stems angled and much twisted. *Bark* greyish-brown or blackish; blaze red, fibrous, green below the outer dead layers. *Innovations* and inflorescence brown, tomentose. *Leaves* 2-pinnate; rachis usually ending in a long bifid tendril or sometimes in a point; stipules small, bristle-like. *Pinnæ* usually about 2 pairs, 2-5 in. long. *Leaflets* 2-4 pairs, 1-3 by .6-1.5 in., obovate or oblong to elliptic, obtuse or bluntly short-acuminate, usually emarginate at the tip; base often oblique, glabrous, dark green and shining above, rigidly coriaceous; lateral nerves rather indistinct, about 7-8 on either half with similar intermediates, meeting in loops near the margin; petiolule about .1 in. long, pubescent. *Flowers* .1-1.5 in. long (excluding stamens), scented, small, pale yellow, crowded on elongate peduncled spikes, 5-7.5 in. long, axillary or paniced from the upper nodes of old leafless branches; bracts minute, linear. *Calyx* green, very small, campanulate, tomentose or pubescent outside, with 5 minute teeth. *Corolla* yellowish-green; petals 5, connate at the base, about .12 in. long, oblong-lanceolate. *Stamens* 10, free, exserted; anthers tipped with minute, deciduous, globose glands. *Ovary* subsessile with many ovules; style as long as the stamens; stigma concave, terminal. *Pod* woody, largest in the family in India, 1-3 ft. by 3-4 in., with thick sutures and a stout stipe, valves adpressed and jointed between the seeds; joints square or the terminal nearly

orbicular, breaking up from one another and the suture. *Seed* discoid, 1·5-2 in. across.

Throughout the Province in plains, ascending up to 1,500 ft.

The seeds contain saponin. They are made into a paste and used as a substitute for soap specially for washing the hair. The shell of the seeds is used for polishing the borders of *dhoties*.

Flrs. 4. Fr. 3-5, the flowering year.

In seedlings all the pinnæ are transformed into tendrils.

## 2. ADENANTHERA Linn.

*Adenanthera pavonina* Linn. *Kuchundana*, Sans.; Vern. *Dieng-thing*, Khasi; *Karli-arong*, Mik.

A handsome middle sized to large unarmed deciduous tree. *Bark* dark-brown or greyish brown, rough on old trees, white or brownish white inside. *Leaves* bipinnate, rachis usually 8-14 in. long but sometimes much longer; pinnæ 3-6 pairs, 3·5-7 in. long, puberulous or glabrescent; leaflets 6-16, alternate, ·8-2 by ·4-1 in., oblong to ovate oblong or elliptic oblong; apex obtuse or subtruncate, sometimes cuspidate; base cuneate, somewhat unequal, dark-green and glabrous above, glaucous and minutely puberulous or glabrescent beneath; main lateral nerves slender, rather indistinct beneath, 8-10, meeting in loops near the margin; petiolule ·1-·15 in. long. *Flowers* minute, 5-merous, greenish-yellow, ·1-·12 in. long in axillary short peduncled, puberulous, racemes, up to 7 in. long or in terminal panicles; pedicels a little shorter than the flowers in length, pubescent; bracts minute, caducous. *Calyx* minute, slightly pubescent or puberulous outside. *Corolla* pale yellow, puberulous outside; segments valvate, equal, connate at the base, linear or lanceolate, acute. *Stamens* 10, free, hardly exserted; anthers crested with deciduous glands. *Ovary* sessile, many ovuled; style filiform; stigma capitate. *Pod* 6-9 in. by ·6 in., flat, curved, valves spirally much twisted when opening. *Seeds* 8-15, bright scarlet, about ·3-·35 in. long, convex on either side, round and lenticular or oblong.

SIBSAGAR, DARRANG, foot of KHASI and JAINTIA HILLS and low elevations on slopes above SYLHET-Shella, Hatmawadan, Tharia, etc. Sometimes planted in gardens.

The seeds are strung into beads in other parts of India. They are supposed to weigh about 4 grains each and are also used as



weights. The heart wood is coral red, when freshly cut and turns purple on exposure, hard and durable.

Flrs. 3-5. Fr. 8-10.

### 3. PARKIA R. Brown.

**Parkia Roxburghii** G. Don. Vern. *Khorial*, Manipuri-*urohi*, Ass.; *Zongto*, Lushai; *Jongta*, *Jongcha*, Kuki; *Yongchak*, Manip.; *Jongcha*, Tipp., *Lonchak*, Sylh.; *Aoelgap*, Garo; *Barri-phang*, Cach.; *Themuk-arong*, Mik.; *Unkam-pinching*, Naga.

A middle sized unarmed tree with spreading branches and pubescent shoots. *Bark* light grey nearly white to brown with white patches, rough; blaze reddish brown with white lines. *Branchlets* with raised lenticels. *Leaves* 2-pinnate; main rachis puberulous or glabrescent, 12-24 in. long, with a gland below the lower pair of pinnæ and a few 1-5, between the upper pinnæ; pinnæ 8-30 pairs, opposite, secondary rachis 3-6 in. long; leaflets 40-80 pairs, close set, sessile, .3-.35 by .75-.1 in., linear oblong, falcately curved forwards, tip acute; base unequally truncate, lower half sub-hastate, dark-green above, puberulous on the margin; midrib prominent. *Flowers* in dense turbinate or clavate long peduncled heads, 1.5-2.25 in. long and .75-1.2 in. across; peduncled, 10-16 in. long, heads sterile towards the bottom; bracts upto .3 in. long, spatulate, silky pubescent outside. *Calyx* tubular, .25-.3 in. long, shortly 5-cleft; teeth tomentose, elsewhere glabrous. *Corolla* pale yellow, tubular, upper portion free; segments extruded above the calyx, sub-valvate. *Stamens* 10, exserted, the filaments connate below and adnate to the corolla tube; anthers narrow, not gland tipped. *Ovary* stalked; many ovuled; style filiform; stigma capitate. *Pod* 10-20 in. by 1.5 in., smooth, dark-brown, ultimately dehiscent.

SIBSAGAR, LUSHAI HILLS, CACHAR, SYLHET, GARO HILLS.  
The tender pods are eaten. The timber is not used.

Flrs. 12.

### 4. MIMOSA Linn.

**Mimosa himalayana** Gamble Incl. *M. rubicaulis* in part.  
Vern. *Kuchoi-kaitkusia-kant*, *Kauri-kanta*, Ass.; *Ingsu-maha*,

*Su-ye-arong*, Mik.; *Katasarkhi*., Mech; *Remsum*, Garo; *Rose*, Jharua.

A large shrub; bark smooth and reddish brown on young branches and pale brown and rough on older stems; branchlets grooved, thickly beset with straight or curved prickles, innovations brown tomentose. *Leaves* bipinnate; rachis 4-9 in. long, prickly, at first downy, glabrescent with age ending in a stiff bristle; stipules .2-.25 in. long, subulate; pinnae 8-12 pairs, often with a short stiff bristle between each pair, ending in a short bristle. *Leaflets* 10-20 pairs on each pinna, lowest pair often reduced to bristle, .25-.3 in. long, oblique, oblong; midrib terminating in a stiff point, glabrous and dark-green above, paler and sparingly hairy beneath. *Heads* .4-.6 in. across on downy peduncles, 1-2 in. long, which are either fascicled on leaf axils towards the ends of branches or arranged on terminal panicles. *Flowers* pink or white, tetramerous; bracts minute, linear, spatulate, hairy outside. *Calyx* campanulate, shortly toothed. *Corolla* .1 in. long; lobes about .04 in. long; stamens 8; filaments filiform, free, much exserted; anthers not gland tipped. *Ovary* glabrous, stipitate, many ovuled; style filiform; stigma terminal, entire. *Pod* 3-5 in. by about .4 in., slightly curved, smooth, 6-10 jointed; joints broader than long, 1-seeded, breaking up and separating from the persistent sutures.

LAKHIMPUR, DARRANG, KAMRUP, NOWGONG, SIBSAGAR, GARO HILLS, GOALPARA, CACHAR, often in clearances and old Jhum.

Flrs. 7-9. Fr. 11-1.

The plant occurring in our area appears to be intermediate in some respects between Gamble's *M. himalayana* and *M. rubicaulis* F. B. I. On the whole it is closer to *M. himalayana* which name has therefore been adopted first.

*Mimosa pudica* Linn. The sensitive plant. *Varah-kranti*, *Laj-jalu*, Sans.; *Lajjabati*, Beng.; *Sharminda*, *Chaitemara*, Beng. (Sylh.); *Adoribon*, *Nilaji-bon*, Ass.; *Lajula-pata*, *Lajura*, Jharua (Garo Hills); *Samukchhip*, Garo; *Suji-gablau*, Cach.; *Chiekanbi*, Kuki; *Kombat-samthia*, *Synteshiuh*, Khasi; *Non-mek-jang*, Mik.

A straggling and spreading deciduous undershrub; stem and branches prickly and clothed with bristles. *Leaves* sensitive; pinnae 4, digitately arranged, 1-3.5 in. long; common petiole beset with ascending bristles; stipules linear-lanceolate with bristly edges; leaflets

12-20 pairs, .3-.4 in. long, obliquely narrow oblong, acute, undersurface adpressed bristly. *Heads* .4-.5 in. across, pink on slender, axillary peduncles, .7-1 in. long, covered with spreading bristles. *Flowers* with the stamens about .1 in. long. *Stamens* 4, much exerted. *Pod* with weak prickles on the sutures, .6-1 in. long; joints 3-5.

A common waste land weed. Originally said to have been introduced from TROPICAL AMERICA.

The roots are used medicinally.

Flrs. 7-11. Fr. 11-12.

### 5. ACACIA Willd.

Trees or shrubs, sometimes climbing, usually spinose or prickly.\* *Leaves* bipinnate,† usually with a gland towards the base of the primary rachis and often several between the pinnæ; stipules sometimes transformed into spines; leaflets small. *Flowers* in globose heads or cylindrical spikes, hermaphrodite or polygamous, usually 5-merous. *Calyx* usually campanulate, shortly toothed. *Petals* valvate, exerted, more or less united in the lower half. *Stamens* indefinite, much exerted, free or connate with one another and to corolla at the base; anthers minute. *Ovary* sessile or stipitate; ovules many; style filiform; stigma minute, capitate. *Pod* dehiscent or indehiscent, often compressed and dry, rarely turgid, subcylindric or moniliform, never breaking up into joints; sutures not thickened, wavy or straight.

#### I. Erect trees or shrubs with stipular thorns:—

- |  |                            |
|--|----------------------------|
| Flowers in heads; prickles straight. . .             | 1. <i>A. Farnesiana</i> .  |
| Flowers in elongate spikes; prickles curved. . . . . | 2. <i>A. Catechu</i> .     |
|  | Var. <i>catechuoides</i> . |

#### II. Climbers with scattered prickles; flrs. in paniced heads:—

##### A. Pods dehiscent, flat, thin.

##### 1. Rachis with a solitary gland below the pinnæ:—

Stem terete; leaflets attached at the base near the upper edge:—

Branchlets pruinose. . . . . 3. *A. pruinescens*.

Branchlets not pruinose. . . . . 4. *A. pennata*.

Stem fluted; leaflets attached at the base about the middle:—

Leaflets close and touching,

\* The introduced Australian Acacias have no thorns.

† In many of the Australian Acacias reduced to phyllodes.

- 1-nerved, the second nerve  
weak and scarcely reaching  
half-way up the leaflet. . . 5. *A. Gageana*.  
Leaflets not touching, strongly  
2-nerved to near the apex. . . 6. *A. oxyphylla*.  
2. Rachis with two conical glands  
below the pinnæ. . . 7. *A. diadenia*.  
B. Pods indehiscent, with thick fleshy  
saponaceous valves. . . 8. *A. concinna*.

1. *Acacia Farnesiana* Willd. Vern. *Tarua-kadam*, Ass.

A thorny shrub or a small tree with smooth dark brown bark and zig-zag lenticellate branches; young shoots downy. *Spines* stipular, straight, .25-.6 in. long, ashy-grey. *Leaf rachis* 1-3 in. long, pubescent, with a small gland at about the middle of the petiole and ending in a bristle; pinnæ 2-8 pairs, up to 1.2 in. long, terminated by minute bristles. *Leaflets* 10-20 pairs, minute, rigid, up to .25 in. long, oblong, acute, glabrescent. *Flowers* yellow, very fragrant in pedunculate heads, .4-.6 in. across; peduncles up to 1.2 in. long, pubescent, fascicled on leaf axils on minute excrescences with a ring of minute, ciliate bracts at near the top. *Calyx* campanulate, minute. *Corolla* small with short obtuse teeth. *Pod* 1.5-3 in. long, brown, slightly curved, somewhat inflated and subcylindric, marked with diagonal striæ, which meet in the middle. *Seeds* in two rows, immersed in pulp.

A native of Tropical America, often planted, sometimes self sown.

The flowers are used in perfumery. The pods and roots are said to be rich in tannin.

Fls. 9-4. Fr. 4-7.

2. *Acacia Catechu* Willd. Var. *catechuoides* Wall. Vern. *Khayer*, Beng.; *Khair*, Hind. Ass. & Nep.

A middle sized, often gregarious deciduous tree with rough brown, sometimes grey, at least partly, rarely black furrowed bark exfoliating in narrow strips, which remain attached for a long time, about .5-.6 in. thick; blaze red with fine white lines, deeper layers near cambium, pale yellow, fibrous; young shoots downy, spines stipular in pairs at the base of the leaf recurved, up to .2 in. long, flattened, dark-brown. *Leaf rachis* 2.5-7 in. long, puberulous or pubescent with one large cupular gland near the base and

2-5 between the upper pinnæ; pinnæ 10-30 pairs up to 1-7 in. long; leaflets about .15 in. long, ligulate, usually 30-50 pairs, sometimes fewer or more; petiolule minute. *Flowers* creamy white, .15 in. long in axillary pubescent spikes, 2-5 in. long; peduncle .5-7 in. long. *Bracts* slightly exceeding the buds, boat-shaped, caducous, nearly glabrous, ciliate on the margins. *Calyx* ultimately glabrous, teeth deltoid. *Corolla* 2-3 times the calyx; lobes glabrous in mature flowers. *Pod* 3-5 by .5-7 in., stipitate, flat, dark-brown, shining, sometimes constricted between the seeds; apex narrowed or subulate, 3-8 seeded; seeds flat, orbicular, .2 in. across.

Sadiya, DARRANG, KAMRUP, GOALPARA, etc., along streams, usually on recent alluvium.

The heartwood is dark red, very hard and durable, seasons and polishes well. Pores usually filled with cutch. Cutch and katha (khair) are obtained by boiling chips of heartwood. The wood yields a superior charcoal.

Fls. 4-6. Fr. 11-2.

**A. Cathecu** Willd.—differs from our plant by having a more hairy rachis, calyx and petals, which are covered with spreading hairs. This may be found in Goalpara. Some of the sheets collected from the District have rather densely pubescent rachis and thinly pubescent or puberulous calyx and petals and thus would seem to occupy an intermediate position between the two.

**A. Suma** Kurz. Vern. *Sankanta*, Beng.

A medium sized tree, resembling the last, with white bark. *Branches* flexuous; branchlets and rachis downy with white or greyish pubescence; spines paired, stipular, short, hooked, sharp, downy when young, afterwards brown. *Leaves* 4-10 in. long with a large oval cup-shaped gland near the base of the petiole and smaller circular glands between the upper pinnæ; pinnæ 10-20 pairs; leaflets 20-50 pairs, .25-.35 in. long, linear-oblong, usually ciliate. *Flowers* white or pale yellow, very small in axillary lax spikes. *Pod* 3-5 by .5-.75 in., pubescent when young.

Sometimes planted in gardens in our area.

Fls. 8. Fr. 12.

**3. Acacia pruinescens** Kurz. Vern. *Rampet-riubi*, Miri and Abor.; *Kachoi-lata*, Ass.; *Te-bam*, Naga; *Suji-doukha*, Cach.; *Shitli*, Kh.

A large climber armed with more or less recurved prickles; branches pruinose. *Leaf rachis* 5-10 in. long, with

a large gland, 1.1-5 in. from the base and smaller ones between the upper 2 or 3 pinnæ, glabrous; stipules deciduous; pinnæ 8-15 pairs, 2.5-4 in. long; leaflets 40-60 pairs, closely crowded, .25-.4 in. long, sessile, linear oblong, with the midrib close to the upper edge, subacute to obtuse at apex; base semicordate to truncate, glabrous or ciliate on the margins, pale beneath. *Heads* yellow, .4-.5 in. across, arranged in axillary panicles, which are at first pubescent, the basal portion becoming pruinose with age. *Bracts* .2-.35 in. long, linear-lanceolate to acuminate-spathulate, tomentose. *Pedicels* usually in fascicles in the axils of bracts, .4-.7 in. long, tomentose. *Calyx* up to about .08 in. long, broadly campanulate; teeth short, acute, more or less pubescent at the tips, otherwise glabrous. *Corolla* exceeding the calyx; lobes lanceolate, puberulous. *Ovary* glabrous. *Pod* not seen.

N. C. HILLS, KHASI HILLS upto 2,500 ft., N. E. FRONTIER, LAKHIMPUR, SIBSAGAR, GARO HILLS.

Flrs. 4.

**4. *Acacia pennata* Willd.** Vern. *Sujai-lewa*, *Bon-siri*, Mech.; *Boloo-lot*, Slyh.; *Kuchai*, Ass.; *Sirengkhi*, *Shil-khing* or *Ser-khing*, Remsu, Garo; *Ther-chi-kli*, *Soh-mysiang*, Kh.; *Jermai-sheih-lyng-kshiah*, Synt.; *Suji-phang*, Cach.

A large prickly climber. *Bark* dark brown to grey, often with horizontal cracks; blaze pink to red, fibrous; branches with about 5 rows of small more or less recurved prickles. *Young* shoots, inflorescence, leaf rachis and pinnæ pubescent. *Leaf rachis* up to 9 in. long with a large cup-like gland near the base and 2-4 smaller between the upper pinnæ, usually prickly. *Pinnæ* 7-16 pairs, 1.5-4 in. long. *Leaflets* from 16 pairs in the lower pinnæ to 30-50 pairs in the middle pinnæ, closely set, often overlapping, .15-.3 in. by .03-.05 in., linear-oblong, unequally broad, sharp acute, midrib starting from near the upper margin at the base to nearly median at the apex, glabrous or nearly so. *Flowers* pale white in pedunculate heads, which are .3-.4 in. across; peduncles 1-4 together, .4-.7 in. long, downy on large terminal leafy panicles. *Calyx* glabrous. *Pod* 4-6 by 1-2 in., strap-shaped, reddish to dark-brown and shining when

mature, sutures thickened; base usually narrowed to a short stalk; apex usually shortly beaked; seeds 8-14.

DARRANG, KAMRUP, SIBSAGAR, CACHAR, SYLHET, GARO HILLS, GOALPARA, KHASI HILLS in low elevations, probably also NOWGONG.

The bark is used for poisoning fish.

Flrs. 7-9. Fr. cold season.

**5. *Acacia Gageana* Craib.** Kew Bulletin 1915 p. 409, Incl. *A. cæsia* Willd. in part.

A large prickly climber with spirally fluted stem; branchlets with 5 lines of prickles, striate; young shoots, rachis and inflorescence pubescent; prickles hooked, small. *Rachis* prickly, up to 7 in. long, with a large circular gland at the base of the petiolar portion and 1-3 glands at the base of the upper pinnæ. *Pinnæ* 7-14 pairs, 1-4 in. long, sometimes with 1-3 glands between the uppermost leaflets; leaflets (6-) 20-30 (-40) pairs, close and usually touching, subsessile, falcate, oblong, obliquely mucronate with the point directed forwards; base truncate, more or less ciliate, glabrous above, hairy on the nerves beneath, .25-.45 by .07-.15 in. with one prominent nerve, the other basal nerves weak and scarcely reaching half way up the leaflet. *Flowers* in panicked heads, lower branches of which arise in upper leaf axils. *Heads* 20-30 flowered; peduncles .4-.7 in. long, 1-4 together; bracts subulate to linear; bracteoles smaller than the calyx, minutely pubescent, somewhat boat-shaped. *Calyx* up to .1 in. long, teeth slightly hairy at the apex. *Corolla* .9-1.2 in. long, glabrous. *Ovary* stipitate, glabrous, pubescent after fertilization. *Pods* pubescent when young, glabrous when mature, thin, variable in size and shape, sometimes with irregular indentations between the sutures, 3.7-6.5 by .8-1.2 in.

Not common, Jenkins! District not mentioned.

Flrs. 10. Fr. later part of cold season.

**6. *Acacia oxyphylla* Graham ex Craib,** Kew Bulletin (1915) p. 409. Vern. *Sue*, Mik.; *Pochui-kant*, *Kecheri-kaint*, Ass.; *Mei-suai*, Kh.

A large woody prickly climber with fluted stem; young

parts grey or brown pubescent. *Rachis* 4-6 in. long with a conspicuous raised, flat-topped gland near the base and another small one between the uppermost pairs of pinnæ. *Pinnæ* (3-) 6-9 pairs, usually up to 3 in. long, often with a minute gland between the uppermost pairs of leaflets. *Leaflets* 8-24 pairs, usually 12-20 pairs not touching, .3-.5 by .1-.12 in., obliquely oblong, acute with the apex directed forwards; base rounded or subtruncate, 4-5 nerved, the one next to the midrib, just falling short of the apex, remaining basal nerves rather weak and somewhat obscure, ciliate on the margins at least when young, glabrous above, glabrescent or very inconspicuously adpressed pubescent beneath; petiolule 0 or minute. *Flowers* white, 40-50 together in heads, arranged in a terminal panicle extending into the upper leaf axils. *Peduncles* .4-.6 in. long, pubescent; bracts up to about .25 in. long, lanceolate, acute or acuminate, longitudinally nerved; bracteoles oblong, glabrous or nearly so. *Calyx* .08-1 in. long, glabrous or slightly pubescent in the lower portion. *Corolla* .1-.12 in. long, glabrous or nearly so. *Ovary* hairy on a glabrous stipe. *Pod* 4-7.5 in. by .75-1.2 in., breadth unequal, darkish-brown and soon glabrous.

SIBSAGAR, N. E. FRONTIER DISTRICT, SYLHET, Saikh-mokim, LUSHAI HILLS—Prazer, Gage; foot of KHASI HILLS—Tharia, probably throughout the province, extending to low elevations, fairly common.

Flrs. 10. Fr. later part of cold season.

7. *Acacia diadenia* Parker. Indian Forester Vol. V. (1929) p. 332. Vern. *Kelle-doukha*, Cach.; *Sulu-rikong*, Mik.

A large woody climber with fluted stem; branches with about 5 lines of prickles. *Bark* grey, thin, yellowish inside. *Young* shoots, *rachis* and inflorescence more or less densely brown pubescent. *Rachis* 3-5 in. long, with 2 conical glands on the petiolar portion and 1-3 smaller glands between the upper pinnæ. *Pinnæ* 6-11 pairs, up to 3.25 in. long, pubescent with 1 or 2 minute, flat glands between the upper pairs of leaflets. *Leaflets* 17-30 pairs, close and touching, .25-.3 by .08-.1 in., rather obliquely linear-oblong, tipped with a forward directed mucro; base truncate or subtruncate,



glabrous and dark green above, paler beneath, margins ciliate; midrib with spreading hairs. *Heads* about 50 flowered in terminal panicles or axillary, appearing bristly in bud on account of the linear acuminate hispid bracteoles; peduncles .4-.6 in. long, enlarging in fruit, bearing a small linear caducous bract at or above the middle, densely pubescent. *Bracts* linear-subulate, villous. *Calyx* about .08 in. long, glabrous. *Corolla* .1 in. long, glabrous. *Ovary* glabrous on a short glabrous stipe, about .2 in. long, the latter surrounded at the base by a cylindric disk. *Pod* 4-6 by .8-1.2 in., brown pubescent, usually with minute glands when young, sutures often undulate, rather prominent.

N. CACHAR HILLS, DARRANG, SIBSAGAR.

Flrs. 8. Fr. 2.

**8. *Acacia concinna* DC.** Vern. *Pasoi-tenga*, *Kusiakaint*, *Kachuai*, *Amsikira*, *Suse-lewa*, Ass.; *Sia-thli*, *Jarmiersa*, Kh.; *Sirengkhi*, *Suchei-wak-chigong*, Garo; *Serhu-arikong*, Mik.

A straggling prickly shrub or a large climber; stem terete with 5 rows of conical and more or less hooked prickles; twigs lenticelled; young parts grey or ferruginous, tomentose. *Leaf rachis* 2.5-5.5 in. long, more or less downy, often prickly, ending in a subulate awn, with a prominent gland near the base and another below the uppermost pair of pinnæ; stipules about .3 in. long, hairy, obliquely ovate, acute, auricled at the base; pinnæ 3-6 pairs, middle ones 2.3-2 in. long. *Leaflets* from 5-6 pairs in the lower pinnæ to 10-14 pairs on the middle pinnæ, .4-.6 by .15 in., oblong; apex usually rounded, cuspidate; base obliquely truncate and midrib closer to the upper margin, membranous, pale-green and glabrescent above and glaucous beneath. *Flowers* brick red in bud, white after opening, on peduncled heads, which are .4-.5 in. across. *Peduncles* .6-2 in. long, downy, usually in fascicles of 2-4, from leaf axils or arranged in panicles at the ends of branches. *Bracts* deciduous, resembling the stipules. *Calyx* red, funnel-shaped, deeply lobed. *Corolla* slightly exserted; lobes white with red median lines. *Ovary* glabrous, except for a few hairs near the top. *Pod* thick and fleshy, 3-4 by

·7-1 in., often indented between the seeds, sometimes curved, stipitate, saponaceous, indehiscent.

DARRANG, SIBSAGAR, NOWGONG, KAMRUP, KHASI HILLS—up to about 2,500 ft., GARO HILLS, GOALPARA.

Flrs. 3-5. Fr. 12-1.

*Var. rugata* Ham. Ovary villose; leaflets and pods larger than in the type—the latter 1-1·2 in. broad.

SYLHET—Badarpur (My sheet 9,678) and probably also elsewhere in the province.

*Acacia dealbata* Link. Vern. *Tiw-babur*, Kh. The silver wattle.

A moderate sized unarmed evergreen tree with nearly smooth grey or dark-brown bark; twigs, leaf rachis and inflorescence hoary. *Leaves* 2-6 in. long, bipinnate; rachis often with glands between the pinnæ; pinnæ 10-20 pairs, about 1·75 in. long. *Leaflets* 30-40 pairs, crowded, linear, ·15-·2 in. long, glaucous, green and pubescent. *Flowers* yellow, fragrant in globular heads, which are about ·35 in. across. *Calyx* minute, campanulate. *Corolla* yellow, about twice as long as calyx, deeply 5 lobed. *Ovary* sessile, minute, hairy; style just exceeding the stamens. *Pod* 3-4 by ·3-·4 in., reddish-brown, little or not, constricted between the seeds.

A native of Australia, cultivated and sometimes naturalized at Shillong.

The bark is rich in tannin containing about 30-35 per cent of tannic acid.

Its growth is rapid and it reproduces itself profusely from root-suckers.

Flrs. 12-2, when it is very ornamental.

A few phyllodineous *Acacias* are sometimes met with in gardens at Shillong but the above is the only common Australian *Acacia* in the station.

## 6. ALBIZZIA Durazz.

Usually unarmed trees, rarely shrubs or climbers. *Leaves* bipinnate, usually with a gland near the base and sometimes between the upper pinnæ. *Flowers* in globose heads (Indian species) sessile or pedicellate, usually pentamerous. *Calyx* campanulate or tubular. *Corolla* funnel-shaped; petals united below the middle. *Stamens* indefinite; filaments several times the length of the corolla, united at the base or high up; anthers minute, not gland

crested. *Ovary* sessile or shortly stalked, many ovuled; style filiform; stigma capitate, minute. *Pod* thin, flat, strap-shaped, indehiscent or tardily dehiscent, continuous within. *Seeds* compressed, exalbuminous.

- I. Erect trees; pulvinus not accrescent; pinnae under 12 pairs; leaflets over .1 in. width :—
  - A. Pinnae usually 1 pair, second pair if present much weaker; leaflets never more than 3 pairs, large (2-6 in. long), acuminate; midrib central or nearly so. . . . . 1. *A. lucida*.
  - B. Pinnae 2-6 pairs; leaflets more than 3 pairs, moderate-sized (under 2-3 in. long), never acuminate; midrib not very close to upper edge :—
    1. Flower heads in panicles; flowers sessile :—
      - Leaf-rachis 10-18 in. long; leaflets over .5 in. broad; midrib diagonal, close to the lower edge for greater length. . . 2. *A. procera*.
      - Leaf-rachis 4-8 in. long; leaflets under .5 in. broad, midrib parallel to upper edge and closer to it. . . . . 3. *A. odoratissima*.
    2. Flower heads from upper leaf axils or in short corymbose racemes; flowers pedicellate :—
      - Leaflets 3-10 pairs; pods straw-coloured. . . . . 4. *A. Lebbek*.
      - Leaflets 12-22 pairs; pods brown. . . . . 5. *A. Kalkora*.
  - C. Pinnae 6-12 pairs; leaflets small, falcate, oblong; midrib very close to upper edge :—
    - Stipules conspicuous; flower heads in panicles; stamens pale white. . . 6. *A. stipulata*.
    - Stipules minute; flower heads from upper leaf axils or in short simple racemes; stamens rose-coloured. . . 7. *A. Julibrissin*.
- II. Climber or small straggling tree, pulvinus below leaf-base, enlarging into a firm short recurved hook; pinnae over 12 pairs; leaflets very small, linear, under .05 in. wide; midrib of leaf central or nearly so. 8. *A. myriophylla*.

1. *Albizia lucida* Benth. Vern. *Moj, Michhagach*, Ass.; *Sundi*, Sylh. and Cach.; *Champa shundi*, Sylh.; *Mijiphang*, Cach.; *Missi*, *Luang-khoi*, Manipur; *Kamatek*, Lush.; *Miji*, Kach.; *Tage*, *Dumbre*, *Lang-git-asing*, Miri; *Dumkol-asing*, Abor.; *Uchupi-arong*, *Ing-hok-arong*, Mik.; *Bumrundu*, Mech.; *Macha-borga*, Garo; *Arda-thol*, *Erbulthing*, Tipp.; *Theng-cher-tam*, *Athi-ong-cha*, Kuki; *Dieng-pantalong*, *Dieng-sa-rynto*, *Dieng-kharu*, Budi, *Dieng-til-pot*, *Dieng-ri-i*, Kh.

A middle-sized nearly evergreen tree. *Bark* nearly smooth, with horizontal wrinkles, and warty with lenticels, green below the cuticle, brown or light red inside, .3-.6 in. thick; young shoots and inflorescence brown, silky. *Rachis* .6-2 in. long, with a large cup-shaped gland .2-1 in. from the base and sometimes another near the top. *Pinnæ* 1.2-5.5 in., usually 1 pair, rarely 2 pairs with a gland at the base of the uppermost pair of leaflets and sometimes below the next pairs. *Leaflets* 2, sometimes 3, rarely 1 pair (second pair of pinnæ when present eglandular with 1 pair of leaflets), generally 2-6 by 1-1.7 in., terminal pair usually largest, lowest sometimes only 1.2 by .6 in., oblong-lanceolate or oblanceolate, somewhat abruptly acuminate; base obliquely cuneate to rounded, glabrous, glossy dark-green above, pale beneath, thinly chartaceous; lateral nerves 7-9 on either half, arcuate; petiolule up to nearly .1 in. long. *Heads* small, peduncled; peduncles .5-1 in. long, slender, glabrate or puberulous with age, 1-4 together, corymbosely or subumbellately arranged on branches, 1.5-6 in. long, which are themselves subcorymbosely arranged on terminal leafy panicles, up to 10 in. long. *Bracts* and bracteoles minute. *Pedicels* up to .1 in. long. *Calyx* about .07 in. long, campanulate, puberulous in mature flowers; teeth short. *Corolla* about .2 in. long, silky outside; segments lanceolate. *Filaments* .5-.6 in. long, pale yellow; staminal tube slightly shorter than the corolla-tube. *Pod* 6-10 in. long, 1-1.25 in. wide, attenuated at both ends, deep brown, reticulated, opposite the seeds, shining elsewhere, thin, flexible at length. dehiscent. *Seeds* 6-8, orbicular.

Throughout the Province ascending to about 2500 ft. in the KHASI HILLS—Common in places in the plains, e.g., SYLHET.

The heart-wood is brown with dark streaks, hard, but it is scarcely used. Weight about 55 lbs. per c. ft. Lac is obtained from the tree. About 550-600 seeds weigh 1 oz.

Flrs. 3-5. Fr. cold season.

Leafless or nearly so for a short time during the hot season.

**2. Albizzia procera** Benth. Vern. *Jigring-bon-phang*, Cach.; *Tantari-asing*, Miri; *Sidak*, Abor.; *Korai*, Sylh.; Ass.; *Lau-khuri*, Mech.; *Khelvi*, *Khereuvi*, Garo; *Chachra-korai*, Jharua; *Warlong-arong*, Mik.; *Sai-noi-ramri*, Kuki; *Dieng-rilong*, *Dieng-soh-krait*, *Dieng-saw*, Kh.

A tall handsome subdeciduous tree, attaining (in Assam) over 80 ft. in height and 7 ft. in girth; bark nearly smooth, yellowish grey or brown outside, peeling off in thin irregular plates, .75 in. thick, green inside below the corky layers, red or pink with white streaks deeper down. *Leaf* rachis 10-18 in. long; basal gland large, oblong or oval. *Pinnæ* 2-6 pairs, 5-9 in. long, often with glands between the upper 1-2 pairs of leaflets; leaflets 6-16 pairs, 1-2.2 by .6-.9 in., oblique, oblong-ovate or rhomboid-oblong, obtuse, silvery when young beneath, both surfaces thinly adpressed pubescent or glabrescent with age, undersurface paler, thinly coriaceous; midrib diagonal, nearer the lower edge except at the apex; petiolules about .05 in. long. *Heads* .5 in. across, usually in fascicles of 2-5, sometimes solitary, arranged in large terminal panicles; bracts caducous; peduncles .5-1 in. long. *Flowers* sessile, yellowish white. *Calyx* about .1 in. long, tubular, glabrous outside; teeth unequal, triangular. *Corolla* up to .2 in. long; lobes oblong-lanceolate, pubescent outside. *Stamens* .4-.5 in. long; filaments yellowish; staminal tube about as long as corolla-tube. *Pods* 4-8 by .6-.9 in., glabrous, reddish-brown, flexible. *Seeds* 6-12.

Throughout the Province ascending to about 2500 ft. in the KHASI HILLS, sometimes grown as standard over tea—for which it is considered very suitable.

Heart-wood brown or with darker bands, resembling that of *A. Lebbek*, durable. The timber is even grained and seasons well. It is suitable for posts, agricultural implements, etc. It is occasionally used for tea boxes for which it should prove very suitable. Average air dry, weight for Assam about 50 lbs. per c. ft. About 500-850 seeds weigh 1 oz.

Growth is fast. Some of the younger branches of the tree are

irregularly deciduous and have been observed to keep on dropping till the fourth year.

\* Flrs. rainy season. Fr. cold season.

**3. Albizzia odoratissima** Benth. Vern. *Hiharu, Goroi*, Ass.; *Cham-koroi*, (N. Kamrup); *Moroi*, Sylh.; *Turut-arong, Narlong*, Mikir; *Khelbi, Sisso*, Garo; *Siris-koroi*, Jharua, *Laukhri*, Mech.; *Moroi, Khoru*, Kach.; *Rumri, Mibang-hing*, Kuki; *Dieng-saw*, Kh.; *Dieng-krait*, Synt.; *Hejui-bang-ching*, Naga.

A large deciduous tree with spreading crown. *Bark* grey or brownish-grey to nearly black and rough outside, inside red with white streaks, soft, about .75 in. thick in old stems; young shoots and inflorescence densely pubescent. *Leaf-rachis* 4-8 in. long, with a large gland at the base, and 1-2 between the upper pinnæ, finely grey downy; stipules small, deciduous. *Pinnæ* 3-5 pairs, 3-6.5 in. long, puberulous or glabrescent. *Leaflets* 7-20 pairs, .6-1.25 by .2-.4 in., oblique, oblong-obtuse or sub-acute, often mucronate, sub-coriaceous, adpressed pubescent on both surfaces or glabrescent above, glaucous beneath; midrib parallel to and closer to the upper edge; base rounded or truncate, and 3-4 nerved on the outer and broader edge; petiolule very short. *Heads* few flowered, solitary or in fascicles of 2-5, on leafy corymbose panicles at the ends of branches; peduncles .5-1.5 in. long; bracts .1-.2 in. long, ovate, acute or acuminate, brown tomentose. *Flowers* sessile, fragrant. *Calyx* very small, campanulate, densely pubescent outside; teeth obsolete or minute. *Corolla* .15-.3 in. long, funnel-shaped, hairy; lobes lanceolate, about .1 in. long. *Stamens* pale-yellow, about .8 in. long; staminal tube about half the corolla-tube. *Pod* 5-12 by .7-1.2 in., shortly stipitate, thin, flexible, tomentose when young, reddish brown or dusky greenish brown, broadly but rather indistinctly reticulate. *Seeds* 8-12.

Plains of ASSAM from GOALPARA & SYLHET to DARRANG, probably in all Districts, ascending to 3000 ft. in the KHASI HILLS.

Sap-wood large, heart-wood dark-brown with darker almost black streaks, hard, durable, takes a fine polish and seasons well; could be used for the same purposes as that of *A. Lebbek*, which it resembles. Weight about 50 lbs. per c. ft. The bark cut into small pieces and

boiled with pounded leaves of *Sarcochlamys pulcherrima* gives a madder-brown dye.

Flrs. 5-6. Fr. cold season.

In some forms the heads are arranged subumbellately or corymbosely on the ends of panicle branches. Larger and more densely pubescent leaflets are usually correlated with this form; as there are intermediates connecting it with the type, it has not been separated.

**4. Albizzia Lebbek Benth.** The Siris tree. *Sirisha*, Sans. & Beng. *Kothia koroi*, Ass.; *Moroi*, Cach. & Sylh.; *Rumri*, Lushai; *Harish*, Sylh.; *Japhang*, Tipp.; *Dieng-sah-rin*, Kh.

A large deciduous tree with a spreading crown. *Bark* light grey to dark-brown or almost black, rough, irregularly cracked; outer half to third of blaze red or reddish-brown, inner portion yellowish or brown with paler strands. *Branches* lenticellate, lenticels sometimes coalescing to form lines; young shoots and inflorescence pubescent. *Rachis* 3-6 in. long, usually with a large oblong gland near the base and one or between the upper pinnæ; stipules small, linear, tomentose, caducous. *Pinnæ* usually 2-5 pairs, 2-8 in. long, often with glands between the leaflets; stipels at the base of the pinnæ, minute. *Leaflets* 3-10 pairs, 1-1.5 by .3-.8 in., obovate to oblong-narrower downwards, pale-green, glabrescent or adpressed pubescent beneath, obtuse or retuse at apex; base unequal, lower end broader half, 2-3 nerved; lateral nerves not prominent, meeting in loops near the margin, fewer on the broader half; petiolules very short. *Flowers* greenish-white, fragrant in pedunculate heads; peduncles 2-4 in. long, downy, solitary or in fascicles of 2-4 from upper leaf axils or at the ends of short leafless branches; bracts caducous, linear, tomentose; pedicel about .1 in. long, slender, pubescent. *Calyx* .15 in. long, pubescent, short toothed. *Corolla* .3 in. long, funnel-shaped, pubescent outside; segments lanceolate. *Stamens* 1-1.5 in. long, fading to yellowish with a green terminal portion. *Staminal tube* a little shorter than the corolla-tube. *Pod* 6-12 by 1.2-1.7 in., pale, straw-coloured, finely reticulate, alternately depressed on either side over the seeds, 4-12 seeded; sutures thickened.

All over the Province but not very common, ascending to about 2000 ft. in the KHASI HILLS, sometimes planted.

Sap-wood large white, heart-wood dark-brown with darker streaks. The timber is hard, seasons and polishes well and is fairly durable.

It is exported largely to America—probably along with the wood of other Albizias under the name of East Indian Walnut for decorative furniture work. It is specially adopted for use in veneering and also for turnery. Average weight about 50 lbs. per c. ft. 140-350 seeds weigh 1 oz.

Flrs. 5-6. Fr. cold season; long persisting on the tree.

**5. Albizzia Kalkora** Prain in Journal of Asiatic Society, Bengal, Vol. LXVI, p. 511. *Mimosa Kalkora Roxb.*

A large tree with rough dark bark; branchlets lenticellate; young parts brown pubescent. *Leaf* rachis 4-8 in. long, at first downy, thin, glabrate, with a large elongated gland .25-.6 in. from the base and often one or more glands below the uppermost pair of pinnæ; stipules .15-.2 in. long, subulate, early deciduous, hairy. *Pinnæ* 3-8 pairs, rarely 2 pairs, 2.5-5 in. long, puberulous, usually with a gland between the uppermost pair of leaflets; lower pairs smaller. *Leaflets* 10-22 pairs, lowest pair often abortive, .5-.9 by .25-.3 in., obliquely oblong, obtuse or sub-acute, often minutely mucronate; base unequal, rigidly subcoriaceous, dark-green and glabrous or nearly so above (when mature), paler and puberulous or glabrescent beneath; midrib parallel to upper edge, lower half broader; lateral nerves 6-7 on the broader half, lower originating from the base; petiolule almost .05 in. long, puberulous. *Heads* 1-5 together from upper leaf axils, many flowered; peduncles 2.5-4 in. long, puberulous, the lower longer, making the inflorescence appear corymbose. *Flowers* deliciously scented, pedicellate, white; bracteoles up to .1 in. long, linear to linear-spathulate, hairy, caducous; pedicels .1-.2 in. long, minutely puberulous. *Calyx* .15-.25 in. long, funnel-shaped, puberulous; teeth unequal. *Corolla* .3-.4 in. long, greenish-white or yellowish-green; lobes lanceolate, .15-.2 in. long, silky on the backs. *Stamens* white, with green tips, 1.1-1.5 in. long; staminal-tube slightly shorter than the corolla-tube. *Pod* 6 by 1 in., strap-shaped, firm, dark-brown, 6-10 seeded; stalked, stalk .35 in. long.



KHASI HILLS, 3000-5000 ft., NAGA HILLS—Gierselere, Kohima, King's collector! nowhere common.

Closely allied to *Albizzia Lebbek* from which it can be at once distinguished by the large number of leaflets, and its dark-brown stipitate pods. \*

In journal of Royal Asiatic Society, Vol. LXVI, p. 512—says the leaflets are 1.1.5 in. long. The Chinese sheets in Herb. Calcutta, have leaflets of this size but in no Indian sheet in the collection there or in the Assam Herbarium they attain this size.

Flrs. 3-4.

**6. *Albizzia stipulata*** Boivin. Vern. *Saw-koroi*, *Sau*, Ass.; *Horish*, *Shirish*, Sylh.; *Arbhu*, *Ghoge siris*, Nep.; *Bolphu*, *Beolphiu*, *Borphi*, Garo; *Bhosra koroi*, Jharua; *Gurgeng-aring*, Miri; *Tat kung-asing*, Abor; *Dieng phyneat*, *Dieng-phallut*, Kh.; *Ching-ring-thing*, *Mabang*, Kuki; *Bongsip*, Lushai; *Luang-khoi*, Manipur; *Inghok-arong*, *Ti-ir-arong*, Mik.; *Bon-phru-phang*, Cach.

A large handsome fast growing flat crowned tree. *Bark* smooth, dark-brown or grey, horizontally wrinkled, lenticellate, outside dark-red or crimson, with white streaks inside, .6-1 in. thick and inflorescence tomentose. *Leaf* rachis 5-12 in. long with one large gland near the base and sometimes one or more between the pinnæ; stipules large, about 1 in. long, deciduous, obliquely semicordate, membranous, acute. *Pinnæ* 6-20 pairs, 2-6 in. long. *Leaflets* subsessile 20-40 pairs, .3-.5 in. by .1 in., falcate oblong, tapering to a sharp point; midrib close to the upper edge, glabrate above, pubescent beneath, downy along the margins. *Heads* pedunculate, in terminal and axillary panicked racemes; peduncles .7-1.2 in. long; bracts about .5 in. long, resembling the stipules, deciduous. *Flowers* sessile, yellowish-white. *Calyx* .1 in. long, tubular, funnel-shaped, tomentose outside; teeth short. *Corolla* .2-.25 in. long, pubescent outside; segments ovate-lanceolate. *Stamens* 1-1.3 in. long; staminal tube up to .17 in. long. *Pod* 4-6 by .5-.7 in., light-brown, thin, glabrous, tardily dehiscent; seeds 4-10.

Throughout the Province, often in old Jhums ascending to about 5000 ft. in KHASI HILLS.

The timber is lighter and less durable than that of *A. Lebbek*.

It is scarcely used but might prove suitable for tea boxes. About 900 seeds weigh 1 oz.

Flrs. 5-8. Fr. cold season.

Var. *Smithiana* Prain. (*Mimosa Smithiana* Roxb.). A tall tree with smooth greenish grey bark. *Stipules* small. *Stamens* with greenish tips.

### 7. *Albizia Julibrissin* Durazz. Syn. *A. mollis* Boiv.

A medium-sized deciduous tree attaining about 50 ft. in height and 4-5 ft. girth, with broad crown. *Bark* rough, dark-brown or almost black, fissured, exfoliating in small irregular woody plates. *Blaze* pink with distant white streaks; young shoots, rachis, pinnæ and inflorescence covered with soft yellowish-brown pubescence. *Rachis* 4-10 in. long, pubescent with a large gland, .4-.8 in. from the base and sometimes with one or two more between the uppermost pairs of pinnæ. *Stipules* .2-.3 in. long, caducous, sub-falcately subulate, pubescent. *Pinnæ* (4-) 5-8, sometimes up to 12 pairs, 2.5-4 in. long; stipellæ minute, subulate. *Leaflets* 10-20 pairs, .4-.7 in. by .15-.25 in., subsessile, falcately oblong, acute; midrib close to upper edge; base inequal, broader half 2-3 nerved, truncate, dark-green above, paler beneath, adpressed pubescent on both surfaces. *Flower* fragrant, pubescent outside in peduncled heads which are solitary or in fascicles of 2-3 and arranged in short racemes at the ends of branches or the lowest from leaf axils. *Peduncles* 1.5-3 in. long; heads 20-28 flowered; bracts .15-.25 in. long, linear or subulate, caducous; pedicels very short. *Calyx* about .15 in. long, tubular teeth triangular. *Corolla* .2-.3 in. long, yellowish-green like the calyx; lobes .1-.15 in. long, oblong-lanceolate, acute. *Stamens* exserted, 1.1-4 in. long, upper  $\frac{2}{3}$  rose pink and lower portion white or entirely white, filiform; staminal tube .15-.2 in. long. *Pod* 2.5-4 in. by .6 in., pubescent till mature, yellowish-brown. *Seeds* usually 2-6, but sometimes more.

KHASI HILLS 4000-6000 ft.

The specific name is a corruption of Hindustani Gulabi-resham—rosy silk which well describes the stamens.

Flrs. 4-5. Fr. 8.

**8. Albizzia myriophylla** Benth. Vern. *Themfra*, Cach.; *Thabphi-rikang*, Mik.; *Mei-theit*, Khasi; *Madhurang-lata*, Naga.

A large woody climber or a large shrub straggling on trees with raised dots on the branches; young parts brown, tomentose. *Rachis* 3·5-7·5 in. long, downy with soft brown hairs as are also the pinnæ, with a large cup-like gland near the base and several between the upper pinnæ; pinnæ 12-20 pairs, 1-2 in. long; stipules subulate, up to ·25 in. long; pulvinus below the leaf base, enlarging in to a recurved sometimes subspinescent almost woody hook. *Leaflets* 25-50 pairs, ·15-·2 in. long, closely crowded, linear, often slightly falcate, subulate; base unequal, hairy along the margins when young, glabrate with age, dark-green above, pale beneath; midrib nearly central. *Heads* small, pedunculate, (peduncles solitary or 2-4 together, ·4-·75 in. long, downy), arranged in terminal leafy panicles; bracts ·15-·2 in. long, ovate, acute or acuminate, usually accompanied by subulate stipules like those of the leaves. *Flowers* sessile; calyx short, campanulate, brown, silky pubescent; teeth acute. *Corolla* ·1-·15 in. long, pubescent outside; lobes lanceolate about one-third the tube. *Stamens* about ·4 in. long; filaments white or greenish; staminal tube about half as long as corolla-tube. *Pod* 4-6·5 in. by ·75-1 in., somewhat flexible, glossy-brown, dehiscent, 6-10 seeded, narrowed at both ends, shortly stipitate.

The fibrous bark is sweetish and of the taste of liquorice.

NOWGONG-Dhansiri Reserve, SIBSAGAR-Barapathar, KHASI & JAINTIA HILLS—Tharia-SYLHET-Hooker.

*Albizzia Gamblei* Prain in Journ. A. Soc. Beng., LXVI, p. 513.

A moderate-sized tree. *Rachis* 3-4 in. long with a large gland a little above the base. *Pinnæ* 2-3 pairs, 1-4 in. long, with large projecting glands between the last pair of leaflets. *Leaflets* 3-7 pairs, ·6-2 by ·4-1 in., decreasing in size downwards, ovate-lanceolate, acute or sub-acute; base cuneate from the middle, pale green above, glabrescent beneath, sparsely adpressed puberulous on both surfaces. *Heads* peduncled; peduncles about 1 in. long in fascicles, arranged in terminal and axillary panicles, minute. *Calyx* about ·1 in. long, campanulate, puberulous; teeth minute. *Corolla* ·2 in. long; teeth small, lanceolate; stamens ·3-·4 in. long, staminal tube about as long as the corolla-tube. *Pod* 6-8 by 1-1·5 in., pale, straw-coloured. *Seeds* 6-8.

NAGA HILLS—Kohima, C. B. Clarke.

Parker suggests in Indian Forester, Vol. LVI (1930), p. 297 *et seq.*, that this plant is a hybrid between *A. Lebbek* and *A. lucida*. A plant has been raised from seeds collected from *A. lucida* tree in the Forest College grounds at Dehra, which is indistinguishable from *A. Gamblei*.

## 7. PITHECOLOBIUM Mart.

Shrub or trees generally with glands at the base of pinnæ and leaflets. *Unarmed* or with spinescent stipules or axillary spines. *Leaves* bipinnate, pinnæ paripinnate; stipules various; stipels 0. *Flowers* in globose heads or sometimes in subumbellate corymbs or spikes, usually hermaphrodite or pentamerous. *Calyx* campanulate or funnel-shaped with short teeth. *Corolla* funnel-shaped or tubular; petals united about half way up. *Stamens* monadelphous, indefinite, much exserted; anthers not gland tipped. *Ovary* sessile or stalked, many ovuled; style filiform; stigma minute capitate. *Pod* generally coriaceous, usually curved or twisted and dehiscent, suture not thickened. *Seeds* compressed, sometimes arillate.

- I. Branchlets not prominently angled; pinnæ usually 1-2 pairs; leaflets few, 1-3 pairs. .. 1. *P. bigeminum*.
- II. Branchlets angled; pinnæ and leaflets each more than 4 pairs :—
  - Terminal leaflets large, usually over 2 in. long; leaflets dissimilar. .. 2. *P. angulatum*.
  - Leaflets all small, more or less similar, 1 in. and under. .. 3. *P. montanum*.

1. *Pithecolobium bigeminum* Benth. Ver. *Bhachahu*, Ass.; *Dieng-yap-yar*, Kh. and Synt.

A small to middle-sized tree; branchlet not angled. *Bark* nearly smooth, light grey or pale brown, more or less warty with lenticels; blaze red or brown, finely fibrous; young parts and inflorescence rusty pubescent; branchlets not prominently angled. *Leaf-rachis* 1-4 in. long, stout, with a raised gland below the lowest pair of pinnæ and usually one each at the base of each pair of pinnæ and leaflets. *Pinnæ* 1-2, rarely 2 pairs; 2-4·5 in. long. *Leaflets* 1-3 on the lower pinnæ, sometimes up to 4 pairs on the terminal pinnæ, 1·5-6 by ·8-2 in., elliptic to oblong-lanceolate or oblanceolate, cuspidate, acuminate or acute; base not or slightly oblique,

sub-coriaceous, glabrous and shining above, paler or brownish and often puberulous along the nerves beneath; main lateral nerves 8-12 on either side, with few shorter intermediates between, arcuate, anastomosing near the margin; petiolules upto .15 in. long. *Flowers* white or pale creamy, sessile or shortly pedicellate upto about .25 in. long in 6-10 fld. pedunculate heads; peduncles .3-1 in. long in copious terminal or axillary panicles or in axillary racemes or sometimes fascicles, puberulous. *Calyx* small, brown pubescent; teeth acute. *Corolla* about double the calyx, .2-.25 in. long, including the calyx, pubescent outside, cleft deep down; stamens .4-.5 in. *Pod* 3-6 (sometimes upto 9) in. long by .6-1 in. broad, twisted once or twice into a spiral, downy when young, glabrescent with age, valves red inside.

KHASIA & JAINTIA HILLS upto 6000 ft. CACHAR HILLS-Præzer!

Wood light, reddish brown, pores scattered, often partitioned, med. rays very fine, often packed together in bends.

Flrs. 2-5. Fr. 1-2.

***P. glomeriflorum* Kurz.**

A shrub or a small tree; pinnæ one pair; branchlets not prominently angled; shoots pubescent. *Leaflets* 1-2 in. long, upto 3 pairs, elliptic-lanceolate, glabrous above, pale beneath; base slightly oblique. *Flowers* usually somewhat larger than in the last sp., .25-.5 in., upto the extremity of the stamens, in lax axillary and terminal rusty pubescent panicles.

I have not seen complete specimens of the species from our area. Most of the sheets referred to this species are *P. bigeminum*, or the materials are too incomplete for determination.

KHASI & JAINTIA HILLS.

Flrs. 3-4.

***Pithecolobium* sp. near *P. affine* Baker (sheet No. 3,662).**

A small tree, rachis stout, 2-2.5 in. long with a gland below the insertion of the pinnæ. *Pinnæ* 4-5.5 in. with a gland below the insertion of the upper leaflets. *Leaflets* 2 pairs, 5-9.5 by 2.5-5 in., elliptic to ovate-lanceolate, acuminate; base cuneate and thinly coriaceous, glabrous; lateral nerves 5-7 on either half; petiolules stout, upto .2 in. long. Flrs. & Fr. not seen.

LAKHIMPUR-Dulung Reserves.

2. *Pithecolobium angulatum* Benth. Vern. *Arda*, Tipp.; *Morog-mara*, Sylh.; *Sorkhi-biphang*, Mech.; *Thorekana*, Bhasahu, Ass.; *Ancharemchu*, Naga; *Theng-semairong*, Mik.; *Mongal*, Garo; *Pani-jigni*, Jharua; *Dieng-iap-iar*, *Dieng-khap-iar*, *Dieng-ia-lai-up-siar*, Synt.

A small to middle-sized tree. *Bark* dark-brown or grey, nearly smooth, with thin horizontal lenticular lines, red to reddish-brown inside; young shoots and inflorescence rusty pubescent; branchlets sharply angled. *Rachis* 2·5-8 in. long, angled, puberulous or glabrescent with a large gland near the base, sometimes with a smaller one immediately above, and usually with a small gland just below the insertion of the pinnæ; pinnæ 2-4 pairs, with a gland just below the insertion of each pair of leaflets; upper 3-7 in. long, lower smaller downwards, lowermost 5·1-5 in. long. *Leaflets* 5-10 pairs in the upper pinnæ, 2-3 pairs in the lower pinnæ, diminishing in size and more oblique downwards, the terminal 3-6 in. by 1·25-2 in., lowermost 6·1 by 5·75 in., comparatively broader, oblong-lanceolate to elliptic or rhomboid-ovate, acuminate or acute, terminal usually with narrowed base; base of lower leaflets subtruncate or rounded, sub-coriaceous, puberulous along the midrib or glabrescent and dark-green above, pale and usually thinly pubescent or puberulous, specially along the nerves beneath; lateral nerves from 4 on either side in the lowermost to 14 in the uppermost leaflets, with several intermediates, meeting in loops near the margin; petiolules up to 1 in. long. *Flowers* white or yellowish-white, 2·25 in. long in peduncled umbellate corymbs; peduncles 2·75 in. long, fascicled in the axils of gland bearing bracteoles on the branches of panicles; panicle branches usually fascicled; upper bracts with a large basal gland and a short simply pinnate foliar portion, lower gradually more leafy; panicles terminal and large, extending to the upper leaves; pedicels up to 1 in. long, in the axils of minute bracteoles, slender, pubescent. *Calyx* 05-07 in. long, campanulate, puberulous; teeth short acute; corolla about 2 in. long, pubescent or puberulous outside. *Filaments* exerted, white or pinkish; staminal tube nearly as long as the corolla. *Ovary* puberulous, short stalked. *Pod* spirally twisted, 7-8 in. by 7 in., distantly

sinuate between seeds on the lower margin; valves coriaceous, velvety when young, puberulous outside when mature, red and glabrous within. *Seeds* 8-10, purplish or bluish-black.

Almost all over the Province from DARRANG southwards ascending to 3000 ft. in KHASI HILLS.

The leaf is used with haritaki (*Terminalia Chebula*), fruits for dyeing cloth black.

Flrs. 3-5. Fr. 1.

**3. *Pithecolobium montanum* Benth.** Vern. *Tareppo-changne*, Duff.; *Riang-arong*, Mik.; *Mathalai-baphang*, Cach.

A small tree. *Bark* dark-brown or grey somewhat rough with close horizontal lenticular lines, red inside. *Branches* sharply angled; young parts rusty or brown pubescent. *Rachis* 6-8 in. long, pubescent; pinnæ 6-12 pairs, gradually smaller downwards, 1-4.5 in. long; leaflets close, from 5 pairs in the lowermost to 12 pairs or more, in the uppermost pinnæ, .5-1 by .25-.3 in., usually slightly broader and shorter downwards in each pinna, usually very oblique, rhomboid or tapeziform-oblong; margins often nearly parallel, acuminate; base more or less cuneate in the upper leaflets, in others the upper half truncate, lower half abruptly cuneate from or above the middle of the lamina, puberulous along the midrib or glabrate above, thinly pubescent beneath, subcoriaceous; midrib diagonal; main lateral nerves 5-10 on either side, looping near the margin; petiolule .05 in. with a circular gland below the insertion of each pair except the lowest. *Flowers* white, pedicellate in capitate peduncled umbels, which are arranged on the branches of an ample panicle; pedicels .1 in. long; calyx about as long as the pedicels. *Corolla* exserted; petals lanceolate, pubescent outside, about .12 in. long. *Pod* 4-5 in. long, twisted, glabrous.

KHASI HILLS, low elevations above SYLHET.

Flrs. 2-3.

### 8. *CALLIANDRA* Benth. •

Shrubs or trees. *Leaves* bipinnate; leaflets few, large, glabrous, (Indian species); stipules usually persistent, often

spinescent. *Flowers* in globose heads, polygamous, 5-merous. *Calyx* campanulate; teeth short. *Corolla* funnel-shaped, 5 cleft. *Stamens* indefinite; filaments connate at the base, much exserted; anthers minute, not gland tipped. *Ovary* stipitate, many ovuled; style filiform; stigma minute, capitate. *Pod* strap-shaped, slightly falcate, flat, rigidly coriaceous; sutures much thickened; valves elastically dehiscent, being rolled backwards from top to bottom.

Common petiole 1·3 in. long; stipular spines strong and ultimately woody; glands at the insertion of pinnæ and terminal leaflets. . . . 1. *C. umbrosa*.  
Common petiole 2·5 in. long; stipular spines weak, never woody, no glands at the insertion of pinnæ and terminal leaflets. . . . 2. *C. Griffithii*.

1. *Calliandra umbrosa* Benth. Vern. *Dieng-sia-soh-maria*, *Dieng-sia-soh-krot*, Kh.; *Utilou*, Manip.; *Patpui*, Lushai & Kuki; *Soambri-baphang*, Cach.; *Thing-seki*; Naga.

Usually a small, (sometimes middle-sized) tree; stem with brown-bark often with stipular spines; innovations puberulous; branches lenticellate. *Leaves* 2-pinnate; common petiole 1·3 in. long; stipules spinescent, considerably enlarging, and becoming woody with age and persisting after leaf fall; pinnæ one pair, 1·2-2·5 in. long, usually with a gland between them. *Leaflets* on each pinna, one pair terminal, 2·7-6 by 1·2-2·4 in. and usually a small odd leaflet, 1·3-2·3 by ·7-1·4 in. below on the outside, obliquely oblong-elliptic, lanceolate, bluntly acuminate or subacuminate, glabrous, rigidly subcoriaceous; main lateral nerves 5-10, arcuate; petiolule up to ·1 in. long with a gland between the terminal pair, and often one, on or below the petiolule of the odd leaflet. *Heads* peduncled, globose ·4 in. across, supported by a ring of minute bracteoles; peduncles ·4-1 in. long, usually clustered on old wood, rarely axillary. *Flowers* white or yellowish-white, sessile. *Corolla* ·12 in. long. *Pod* 6-10 by ·75-1 in.; valves finely reticulate with raised nerves; sutures elevated with rounded thickened edges. *Seeds* 4-9, ·5-·7 by ·35-4 in., broader than long, much compressed.



: KHASI HILLS towards the foot on slopes facing SYLHET-Tharia, Pamati, Hatmawdan—locally common; SYLHET; CACHAR—Barak Reserve, Lower Jiri Reserve, Katakhal Reserve, etc.

The wood is said to burn badly with an offensive smell.

Flrs. rainy season. Fr. 2.

## 2. *Calliandra Griffithii* Benth.

A bushy shrub. *Rachis* short, .2-.5 in. long; stipular spines short and weak up to .2 in. long, sometimes obsolete. *Glands* absent at the insertion of pinnæ or leaflets. *Pinnæ* 1 pair, .3-.6 in. long, with a pair of large terminal leaflets, 1.7-3.2 by .5-1.5 in. and an odd smaller leaflet on the outer side .7-1.5 by .25-.6 in., obliquely narrow lanceolate to lanceolate, acuminate, glabrous, rigidly subcoriaceous; main lateral nerves 6-9 on either side. *Heads* axillary, supported by small linear lanceolate bracteoles on slender peduncles .75-.2 in. long. *Flowers* sessile, about .35 in. long. *Calyx* .08 in. long. *Corolla* lobes lanceolate, about .1 in. long. *Pod* not seen.

KHASI HILLS 2000 ft., (Mann 426!) Mahadeo—3000 ft., (Kanjilal 4623).

Flrs. 9-10.

## 9. ENTEROLOBIUM Mart.

*Enterolobium saman* Prain. Syn. *Pithecolobium saman* Benth. The rain tree.

An evergreen middle-sized to large soft-wooded tree with a spreading crown. *Bark* dark-grey almost black in old trees; young shoots pubescent. *Leaf* rachis 4-6 in. long, often with a gland between each pair of pinnæ but none at the base, pubescent; stipules small, pubescent, deciduous; pinnæ 3-7 pairs, shorter downwards with glands between each pair of leaflets. *Leaflets* smaller downwards, 6-10 pairs in the upper, 2-3 pairs in the lowermost pinnæ; 1-2 by .5-1 in. obliquely rhomboid or ovate-oblong, obtuse, glabrous above, more or less pubescent beneath, specially along the nerves; midrib diagonal. *Flowers* 5-merous in dense rose-coloured heads on pubescent peduncles, 1-3 together from the upper axils and 2-3 in. long; pedicels slender, short, each with a small bract. *Calyx* pubescent outside, about .15 in.

long; teeth broadly triangular. *Corolla* pinkish, .3 in. long; tube puberulous outside; lobes half as long as the tube. *Stamens* connate below; filaments pink about 1.25 in. long. *Ovary* sessile, many ovuled; style filiform. *Pod* 5-9 in. by .6 in., indehiscent; sutures thickened; mesocarp pulpy; endocarp crustaceous and forming septa between the seeds.

A native of Guiana. Planted at Kulsí and often as a shade tree in the plains. \*

The pod is eaten by cattle. The pulpy mesocarp of the pods is sweetish. The tree is very fast growing and easy to propagate but is easily broken by winds.

Fls. 2-6. Fr. 3-4.

## FAM. 51. ROSACEÆ

Trees, shrubs or herbs. *Leaves* rarely opposite, simple or compound, stipulate; stipules sometimes adnate to the petiole. *Flowers* usually bisexual, regular, 5-merous. *Calyx tube* (hypanthium), free or adnate to the ovary. *Disk* lining the calyx tube or annular. *Stamens* perigynous, usually indefinite, rarely 5, 10 or 1 in one or many series; filaments free, rarely partially united, incurved in bud; anthers small, 2-lobed, opening longitudinally, introrse. *Carpels* free or connate; styles free or connate, basal, lateral or subterminal; ovules 1 or more in each carpel. *Fruit* various, sometimes formed partly from the calyx tube. *Seeds* erect or pendulous; albumen usually 0.

I. Calyx tube free or nearly so in flower :—

A. Calyx tube never completely enclosing the ripe carpels :—

1. Carpels solitary; fruit drupaceous :—

a. Petals conspicuous; drupes not transversely oblong :—

Style in fruit terminal; stone bony or nearly so. .. .. 1. *Prunus*.

- Style in fruit sub-basal; stone coriaceous. .. .. 2. *Prinsepia*.
- b. Petals inconspicuous; drupes transversely oblong. .. .. 3. *Pygenm*.
2. Carpels 5 or more :—
- a. Fruit of free drupes. .. .. 4. *Rubus*.
- b. Fruit of follicles :—
- Follicles 5 or more; testa membranous. .. .. 5. *Spiræa*.
- Follicle usually solitary nearly enclosed in the calyx tube; testa crustaceous. .. .. 6. *Neillia*.
- B. Calyx tube completely enclosing the ripe carpels; leaves imparipinnate; carpels free. .. .. 7. *Rosa*.
- II. Calyx tube adnate to the carpels :—
1. Ovary 5-celled; ovules 3 in each cell. .. 8. *Docynia*.
2. Ovary 2-5-celled; ovules 2 in each cell :—
- a. Fruit baccate; flowers in dense panicles. .. .. 9. *Eriobotrya*.
- b. Fruit fleshy but not baccate; inflorescence corymbose or in fascicles :—
- Fruit a pome; endocarp not extended nor dehiscent. .. .. 10. *Pyrus*.
- Fruit with a crustaceous, loculicidally dehiscent 5-celled endocarp. .. 11. *Stranvæsia*.
- Fruit with membranous endocarp; ovary 2-3 celled :—
- Leafy shoots entirely glabrous; leaves entire; styles nearly free; testa of seeds smooth. .. .. 12. *Photinia*.
- Leafy shoots woolly when young; leaves serrate; style united about half way down; testa of seed reticulately lacunate. .. .. 13. *Pourthima*.
- Fruit a drupe with 2-5 bony stones. 14. *Cotonaster*.

### 1. PRUNUS Linn.

Shrubs or trees. *Leaves* alternate, simple, entire or toothed; petiole often 2-glandular towards the top. *Flowers* white or red, racemed, fascicled or solitary. *Calyx* free, completely deciduous or base of tube persistent; lobes 5, imbricate. *Petals* 5. *Stamens* many, 15-16, inserted at the mouth of the calyx tube; filaments free. *Carpel* 1; style terminal; ovules 2, collateral, pendulous. *Fruit* a drupe

with an indehiscent or 2 valved, smooth or rugged, 1 seeded stone. *Seed pendulous.*

I. Leaves serrate :—

A. Leaves closely serrate, deciduous :—

1. Flowers white in many flowered elongate racemes; petiole eglandular :—

Leaves usually glaucous beneath; lateral nerves 13-22; stone hard-shelled, about .6 in. long, ..

1. *P. nepalensis.*

Leaves green beneath; lateral nerves 8-13; stone thin-shelled, about .25 in. long. ..

2. *P. undulata.*

2. Flowers in subumbellate fascicles; peduncles short or 0; petiole glandular. Flowers pink, fading to white. ..

3. *P. cerasoides.*

B. Leaves distantly serrate; evergreen.

Petiole glandular; stone rugose. ..

4. *P. Jenkinsii.*

II. Leaves entire or nearly so :—

Leaves without black glands beneath; drupe .5-.6 in. long, ovoid with a more or less pointed tip. ..

5. *P. acuminata.*

Leaves conspicuously dotted beneath with black glands; drupe up to .3 in. across, globose. ..

6. *P. punctata.*

1. *Prunus nepalensis* Ser. Vern. *Saiong*, Khasi; *Sohiong*, Syntang.

A moderate sized to a fairly large deciduous tree attaining about 60 ft. in height and 4 ft. in girth. *Bark* grey or greyish white, somewhat rough with short vertical fissures and warts outside, greenish white inside, about .2 in. thick; *branchlets* purplish, shining, lenticellate. *Bud-scales* outer smaller, reddish-brown, ciliate, inner longer, membranous, yellow and brown. *Leaves* 3-6 by 1.2-2.5 in., lanceolate, oblong-lanceolate, caudate-acuminate, crenate-serrate; base rounded to acute, thinly subcoriaceous, glabrous above, glaucous beneath; lateral nerves 14-22 on either half; nervules very finely reticulated; petioles .7-1.2 in. long, channelled, glandular; stipules .25-.3 in. long, caducous, linear laciniate. *Flowers* white; racemes terminating leafy shoots or axillary, 2.5-5 in. long, bearing flowers down to the base, grey pubescent; bracts linear, about .1 in. long, early deciduous;

pedicels .1-.15 in. long, pubescent, enlarging to .3-.4 in. and closely lenticellate in fruit; buds ovoid. *Calyx* turbinate or hemispheric, grey pubescent, nearly .1 in. long; base of the calyx tube persistent and enlarging in fruit; teeth small, obtuse, subacute. *Corolla* .1-.15 in. long, broadly-obovate or orbicular. *Stamens* 20-30. *Ovary* glabrous. *Drupe* fleshy, .7-.8 in. long, black, globose, acid or subacid; stone smooth, about .6 in. long.

KHASI HILLS 4-6000 ft; often cultivated for the fruits.

Flrs. 10-11. Fr. 7-8.

***Prunus bracteopadus*** Koehne in Fedde's Report, spec. Nov. Vol. IX, 1910, p. 33.

*Leaves* 2.5 by .5-2.2 in. oblong or ovate lanceolate, sharply or caudate acuminate, minutely serrulate, lowest pair glandular; base rounded or acute, glabrous pale beneath; petioles usually .3-.45 in. long; stipules about .2 in. long, linear, glandular fimbriate. *Racemes* 3-5 in. long, bearing flowers to the base, terminating short leafy shoots, puberulous; bracts upto .12 in. long, membranous, with finely ciliate margins. *Calyx* tube about .15-.2 in. across, minutely puberulous or subglabrous, hairy at the base; sepals very short. *Petals* upto .2 in., obovate-oblong. *Stamens* 27-37. *Ovary* glabrous. *Drupe* not fleshy; stone .6-.7 in. long.

Jowai-King's collector! KHASI HILLS. Hk. f. & Thomson.

Flrs. 10.

Included under *P. nepalensis* in F. B. I. It differs mainly by the longer persisting bracts and more minute serrature of leaves.

## 2. *Prunus undulata* Ham. *Dieng-tyrkhum*, Khasi.

A small deciduous tree; young shoots puberulous; branchlets glabrous. *Leaves* 2.3-5 by .6-1 in., rather narrowly lanceolate or oblong-lanceolate, long acuminate, often undulate, crenate-serrate; teeth gland tipped, basal, often totally glandular; base rounded or acute, membranous, glabrous but hairy along the nerve axils and ultimately glabrescent beneath; lateral nerves 8-13 on either half; petiole .2-.35 in. long, eglandular. *Flowers* white. *Racemes* 2.5-5 in. long, puberulous, from axils of fallen leaves; pedicels slender, puberulous or glabrate, .1-.2 in. long. *Calyx* shorter than the pedicel, glabrous, more or less persisting in fruit; lobes obtuse, gland-toothed. *Petals* sub-orbicular, about .08 in. long. *Ovary* glabrous. *Stamens*

10-15, short. *Drupe* globose, pointed; stone thin-walled, smooth, about .25 in. long.

KHASI HILLS 3000-5000 ft.

Flrs. 4-5. Fr. 8-9(?).

3. *Prunus cerasoides* D. Don. Syn. *P. Puddum* Roxb. *Dieng-soh-iong-krem*, *Dieng-kadi-tusao*, Khasi; *Dieng-tyr-khung*, Synt.

A handsome middle sized deciduous tree. *Bark* more or less smooth, peeling off in horizontal dark-brown strips, exposing shining copper-coloured surface. *Blaze* yellowish, turning dark-brown. *Leaves* conduplicate in bud, 2.5 by 1.2 in., elliptic or ovate-lanceolate, caudate-acuminate; base rounded or acute, sharply singly or doubly serrate; serratures gland tipped, thin, dark-green and shining above, paler beneath, glabrous on both surfaces except for few tufts of hair on all or some of the nerve axils; lateral nerves 8-12 on either side; tertiaries subparallel; ultimate nervules very finely reticulated; petiole .4-.6 in. long, channelled, with usually a pair sometimes more of small reddish glands near the top; stipules linear, glandular-fimbriate. *Flowers* pink, fading to white, appearing before or with the leaves, in subumbellate, subcorymbose fascicles; peduncles 0 or very short; pedicels slender, .3-.6 in. long. *Calyx* tube narrow, campanulate, about .4 in. long, glabrous; base persistent in and supporting the fruit; lobes ovate, acute, .1-.15 in. long. *Petals* .3-.4 in. long, obovate; stamens many. *Ovary* glabrous. *Drupe* .5-.7 in. long, ellipsoid or oblong, yellow, sometimes tinged with red; stone bony, uneven and furrowed on the ventral face.

KHASI HILLS 4-6000 ft.

The wood is reddish-brown, close grained, polishes well. The branches make excellent walking sticks with the bark on.

Flrs. 10-12. Fr. 6.

Leaves shed towards the end of the rains. Very ornamental when in flower. The stone of our plant is *not* rugose as described by Hooker, Brandis, Parker, etc., but in other respects it does not differ from typical *P. cerasoides*.

4. **Prunus Jenkinsii** Hk. f. & Th. Vern. *Bon-thereju*, *Therejutenga*, Ass.; *Dieng-soh-setang-hi*, Synt.

An evergreen medium sized tree attaining about 60 ft. in height. *Bark* dark-grey or brown with lenticular warts outside, thin inside, light or reddish-brown, darkening on exposure. *Branchlets* glabrous, lenticellate. *Leaves* 4-7 by 1-2-3 in., narrowly lanceolate to oblong lanceolate, caudate-acuminate; base acute or cuneate, sharply but distantly serrate, glabrous, dark-green and glossy above, paler beneath; lateral nerves 9-15 on either half, arched; nervules finely reticulated; petiole .2-.3 in. long, eglandular; stipules linear-lanceolate. *Racemes* 1-5-3 in. long, axillary, pubescent, strict, more or less erect, dense frd.; pedicels .25-.35 in. long, pubescent. *Flowers* white. *Calyx* about .15 in. long, broadly turbinate, pubescent, specially towards the base; basal portion of calyx tube persistent; lobes obtuse, minutely toothed. *Petals* orbicular. *Stamens* 20-25, about .15 in. long. *Ovary* glabrous. *Drupe* acid, .8-.9 in. long, ovoid, obovoid or subglobose; stone pointed or rounded at the apex, rugose, with a thick ridge on one side.

SIBSAGAR, LAKHIMPUR, KHASI HILLS—low elevations. Sometimes cultivated for the fruits.

Leaves turn yellow before falling.

Fls. 10. Fr. 2.

5. **Prunus acuminata** Wall. Vern. *Dien-soh-iong-blei*, Khasi.

A moderate-sized or small tree. *Bark* grey or dark-brown to almost black and closely warted outside, inside reddish-brown or reddish, finely fibrous, often with a smell of bitter almonds, .2-.3 in. thick. *Branchlets* thickly lenticellate, glabrous all over. *Leaves* 3-5-5 by .75-2 in., lanceolate, usually caudate, acuminate, tip often mucronate, subcoriaceous, entire,—undersurface paler and sometimes with obscure minute black glands; lateral nerves 6-8, arcuate; petiole .2-.3 in. long, channelled, eglandular; stipules caducous, linear. *Flowers* white, scented, in axillary racemes. *Racemes* 1-3 together, 1-7-3-5 in. long; bracts minute, caducous; pedicels about .1-.2 in. long. *Calyx* .12-.15 in. long, cup-shaped, basal portion persisting in fruit; teeth

obscure. *Petals* about .1 in. long, broadly elliptic or suborbicular (oblong according to Hooker). *Stamens* about 15. *Ovary* villous; stigma capitate. *Drupe* .5-.6 in. long, ovoid, subacute tip, glabrous; stone thin, quite smooth.

KHASI HILLS 2350-5000 ft. GOALPARA-Mann (?) (if the label is correct).

Wood reddish-brown with pretty silver grain in radial section, takes a fine polish; pores small; medullary rays of two kinds very fine ones, alternating with fewer broad rays. According to Gamble used for planking and boxes in the Darjeeling District.

Flrs. 10-11. Fr. 6.

**6. *Prunus punctata* Hk. f. & Th. *Dieng-ning-iong*, *Dieng-snoin-iong*, *Dieng-jar-maikoh*, *Dieng-soh-dkhiew-synrang*, *Dieng-soh-iong-trong*, Kh.**

A small evergreen tree; bark dark grey or dark brown to almost black, thin, inside light red or brown turning darker brown on exposure; branchlets pubescent when young. *Leaves* 2.4-5 by .7-1.5 in., lanceolate or oblong-lanceolate, elliptic-oblong, caudate acuminate; tip obtuse, crowned by a hooked mucro; base cuneate to rounded, distantly serrulate, subcoriaceous, glabrous, shining above, dotted below with minute black glands; lateral nerves 8-10 on either half, meeting near the margin in loops; petiole .2-.3 in. long, eglandular; stipules caducous, linear or subulate, .3-.5 in. long with few distant weak gland-tipped teeth. *Racemes* slender, axillary, 1-2.2 in. long, glabrous, bearing up to 10 flowers, lower half to two-third of the racemes with no flowers; pedicels .15-.2 in. long; bracts subulate, .1-.15 in. long, caducous. *Flowers* white about .2 in. across. Calyx broadly turbinate; tube glabrous or silky hairy at the base and persisting in fruit; lobes rounded, erose and ciliate. *Petals* about .1 in. long, suborbicular; stamens about 20? (30 according to Brandis); ovary glabrous. *Drupe* .25-.3 in. across, globose, smelling strongly of bitter almonds; stone thin-shelled, smooth.

KHASI HILLS, 4000-5000 ft.

Flrs. 4. Fr. 9-10.

***Prunus persica* Benth et Hk. f. The Peach.**

A small to moderate sized deciduous tree. *Leaves* 2.5-4 in. long, narrowly lanceolate or oblong lanceolate, acuminate, sharply serrate,



glabrous and dark green above, pubescent beneath along midrib when young; petiole glandular or not; stipules subulate, fimbriate. *Flowers* pink, usually before sometimes with the leaves, mostly solitary from scaly buds on 1-st years wood. *Drupe* downy, succulent; stone deeply and irregularly furrowed.

Cultivated mostly in the hills and also in the plains. A variety with double flowers is grown as an ornamental plant about Shillong.

Flrs. 1-2. Fr. 5-7.

***Prunus communis*** Hudson. incl. *Prunus cerasifera* Ehr. Plum, Damson, etc.

A shrub or a moderate sized tree, sometimes spinescent. *Leaves* lanceolate or oblanceolate, acuminate, glabrous, serrate; petiole glandular; stipules linear fimbriate. *Flowers* white in fascicles from lateral buds. *Drupe* globose or oblong, smooth.

Cultivated in Shillong.

Flrs. 2. Fr. 6-7.

The copper plum *Prunus cerasifera* var. *Pissardi* has been introduced at Shillong where it is grown for its ornamental reddish purple foliage.

***Prunus triflora*** Roxb.

A small tree. *Bark* smooth, blackish, glabrous. *Leaves* 2-3 by 1-1.5 in., obovate, oblanceolate, acuminate, crenulate; base acuminate, biglandular; petiole slender, .3-.6 in. long; stipules ciliate; lateral nerves 6-9 on either side. *Flowers* small, bisexual, regular, arising from the axils of fallen leaves in small fascicles; pedicels slender, about .5 in. long. *Calyx* glabrous; lobes longer than the tube, shortly clawed; filaments many. *Stigma* conspicuous; style long. *Fruit* a drupe, size of a cherry, pruinose, dark purple, cordate-ovoid (Kurz).

Cultivated, KHASI & JAINTIA HILLS.

Leafless in cold season. Flrs. 2. Fr. 5.

## 2. PRINSEPIA Royle.

***Prinsepia utilis*** Royle. Vern. *Sohmonrit*, *Dieng-siu-soh-khar*, *Dieng-sla-soh-mon*, Kh.

A large straggling shrub attaining about 12 ft. in height; bark rough, exfoliating in papery scales, thin; blaze yellowish; branches several, green, armed with stout axillary often leaf bearing spines, up to 2.5 in. long; young parts puberulous. *Leaves* alternate, 1-3 by .3-1 in. oblong to ovate-lanceolate, acute or acuminate, minutely glandular, serrate, coriaceous, glabrous, dark green above, paler beneath; main lateral nerves 7-9 on either half, impressed

above; base narrowed, often abruptly, to a channelled petiole, up to .6 in. long; stipules caducous, linear, up to .2 in. long. *Flowers* yellowish-white or white, .3-.4 in. across in short axillary racemes; buds globose; racemes often in pairs, up to 2 in. long, puberulous; bracts minute, sharp-pointed; pedicels .3-.5 in. long. *Calyx* cup-shaped, persistent, puberulous, often with a tinge of purple outside; lobes 5, unequal imbricate in bud, up to .15 in. long, suborbicular, more or less erose. *Petals* imbricate in bud, suborbicular-obovate or orbicular, about .2 in. long, shortly clawed. *Stamens* many in several series of the mouth of the calyx tube; filaments short; anther cells separated by a broad connective. *Carpel* 1, free; style basal, short, thick; stigma expanded, depressed in the centre; ovules 2 pendulous. *Drupe* .5-.7 in. long, cylindric-oblong, deep-purple, almost black and pruinose when ripe; style scar sub-basal; endocarp coriaceous, smooth, 1 seeded.

KHASI & JAINTIA HILLS, over 4000 ft. In open slopes, often in village hedges.

Fra. 12. Fr. 3-4.

### 3. PYGEUM Gærtn.

Evergreen trees or shrubs. *Leaves* alternate, usually quite entire, often with two glands towards base of the blade. *Stipules* minute, fugacious. *Flowers* small, in racemes, sometimes unisexual by the ovary being sometimes absent. *Calyx* free, deciduous; limb 5-15 toothed, often unequal. *Petals* minute, 5-6, often tomentose and undistinguishable from the calyx lobes or absent. *Stamens* 10-50 in one or more series on the rim of the calyx tube; filaments slender, incurved; anthers small. *Carpel* 1, at the base of the calyx tube; style sub-terminal, slender, exserted; stigma capitate; ovules 2, collateral, pendulous. *Fruit* a transversely oblong-obscurely didymous, rarely subglobose drupe; pericarp thin, dry or juicy. *Seeds* usually 2; cotyledons very thick, hemispheric.

The leaves and fruit if crushed emit a strong smell of bitter almonds.

Leaves glabrous beneath; ovary glabrous or nearly so; drupe 1 in. or more across :—

Racemes pubescent. .. .. 1. *P. acuminatum*.

Racemes glabrous. .. .. 2. *P. glaberrimum*.

Leaves clothed beneath with somewhat harsh brown hairs; ovary densely villous; drupe about .5 in. across. .. .. 3. *P. montanum*.

### 1. *Pygeum acuminatum* Coleb. *Ril-deng-thing*, Kuki.

A moderate sized to large tree. *Bark* grey or dark-grey, slightly rough with light fissures and warts outside, thin; inside greenish-white or pinkish brown, darkening on exposure; blaze and fruit usually with a smell of bitter almonds; branchlets with raised lenticels; young parts pubescent but soon becoming glabrous. *Leaves* 3.5-7 by 1.5-3 in., oblong, ovate-lanceolate or elliptic, acuminate; base usually unequal, cuneate or acute, quite entire, basal glands 0; lateral nerves 6-8; tertiaries subparallel, both impressed above; petioles .3-.5 in., channelled, puberulous, ultimately glabrous. *Racemes* a little shorter than the leaves, slender, axillary, densely pubescent. *Flowers* small; pedicels about .15 in. long. *Calyx* 6 lobed, lobes narrowly lanceolate, basal portion of calyx tube persisting in fruit; petals 6, villous. *Stamens* about 30. *Ovary* glabrous but with a ring of persistent hairs at the base. *Drupe* about 1 in. across, transversely oblong, glabrous.

GOALPARA, Haltugson, Guma Reserve; CHACHAR-Barak Reserve, apparently not common.

Fl. 5.

### 2. *Pygeum glaberrimum* Hk. f. *Bol-mangsam*, Garo; *Gandhi-gach*, Ass.; *Kadong-asing*, Miri, Abor; *Dieng-soh-kynti*, *Dieng-soh-khyrnem*, Kh.; *Raphir*, Lushai; *Ranphir*, Tippera; *Tia*, Nep.; *Bomphang-rakhet*, *Mukhra-Letei*, Mech; *Hanam*, Naga.

A large evergreen tree attaining 100 ft. in height and 8 ft. in girth. *Bark* usually grey, somewhat rough with fissures and lenticular warts outside, thin; blaze reddish-brown to brown with lighter streaks, darkening on exposure and smelling of bitter almonds; young parts puberulous; branchlets lenticellate. *Leaves* rather variable, oblong-ovate-

lanceolate to sometimes elliptic, caudate-acuminate; acumen long or short, entire; base cuneate or acute, usually without glands; lateral nerves 5-8 on either half, depressed; petiole .2-.5 in. long, channelled. *Racemes* slender, glabrous, 1-2 together from leaf axils, 1.5-4 in. long. *Pedicels* .15-.2 in. long, much elongated in fruit. *Calyx* up to .1 in. long, turbinate, glabrous; base of calyx tube silky pubescent and persistent in fruit; teeth obscure, villous. *Petals* about .1 in. long, oblong, hooded. *Stamens* 12-15. *Ovary* thinly hairy, soon glabrate; style exserted, long; stigma dilated. *Drupe* .6-.7 in. long by 1.1-2 in. across, transversely oblong, obscurely didymous; stone reticulately marked and with a short beak.

Throughout the province ascending to about 2000 ft. (to 5000 ft. according to Gamble) in the Hills, nowhere common.

The leaves and fruit smell of bitter almonds when bruised.

Fls. 11. Fr. 2.

**3. *Pygeum montanum* Hk. f. *Dieng-cha-lawan-synrang*, *Dieng-soh-iong-blei*, Kh.; *Dieng-satler-soh*, *Dieng-stain-sine*, Synt.**

A small to medium sized tree. *Bark* light grey or brown to almost black and somewhat rough with warts outside, thin; blaze reddish or reddish-brown, turning darker on exposure, with characteristic smell of bitter almonds; young parts tomentose or pubescent; branchlets stout, lenticellate. *Leaves* 3-7 by 1.4-3.5 in., oblong to ovate-lanceolate or elliptic, sharply acuminate; base rounded or subcordate, often unequal and with two raised glands above with corresponding pits on the undersurface, coriaceous, glabrate above except along the midrib and often along the nerves when mature; margins ciliate with spreading hair at least when young, undersurface pubescent or tomentose specially on the nerves; nerves and nervules impressed above; main lateral nerves 9-12 on either side, arched; petioles .2-.5 in. long, rusty pubescent or tomentose; stipules up to .4 in. long, lanceolate. *Racemes* 1-2 in. long, solitary or in fascicles of 2-3 from axils of fallen leaves or from leaf axils, often branched from near the base, tomentose; pedicels up to .12 in. long; bracts minute, tomentose.

*Flowers* about .3 in. across when fully open, greenish-white or pale-yellowish, slightly scented. *Calyx* about .15 in. long, campanulate, tomentose outside; tomentum brownish or rusty with age, glabrous or nearly so within; base persistent; teeth 5, minute, woolly. *Petals* a little larger, white, woolly. *Stamens* 15-20; filaments white. *Ovary* densely silky-villous; style exserted, hairy towards the base. *Drupe* .3 in. long by .4-.6 in. wide, transversely oblong or obscurely didymous, usually with a very short beak, thinly pubescent.

LAKHIMPUR, DARRANG, KAMRUP, SIBSAGAR. KHASI HILLS—ascending to 5500 ft.; probably also in CACHAR and NOWGONG, not common.

Wood reddish-brown with unevenly distributed pores conspicuous on a longitudinal section, seasons well, but is not used in the Province except for fuel.

Flrs. 10-12. Fr. 2.

The following are very closely allied and are probably only varieties :—

1. *P. ciliatum* Koehne, in Engler's Botanische Jahrbucher, Vol. LI, p. 184.

*Leaves* 3-6 by 1.2-2.5 in., lanceolate, elliptic or ovate, lanceolate, shortly but sharply acuminate; margins ciliate, basal glands raised above, pitted beneath, glabrate above, undersurface pubescent or tomentose, specially on the nerves; lateral nerves 9-10; petioles .2-.3 in. long, thick. *Racemes* 1.5-2.3 in. long, sometimes slightly branched near the base in fascicles of 2-3 from nodes of last year's branches, rusty or brown tomentose. *Calyx-tube* broadly tomentose, about .1 in. across; lobes linear. *Stamens* about 50. *Drupe* .3-.4 in. across.

NAGA HILLS, Tangli Bam. Prain's Collector!

Flrs. 10. Fr. 12.

Differs from *P. montanum* mainly by its longer inflorescence, larger number of stamens and smaller fruits.

2. *P. ocellatum* Koehne in Engler's Botanische Jahrbucher, Vol. II, p. 184.

Current year's shoots glabrate with age. *Leaves* 2.4-3.6 in. by 1.2-1.4 in., margins ciliate; base subcordate or rounded, glands pitted on the undersurface, orbicular; lateral nerves 6-11 on either side, rest as in *P. ciliatum*.

KHASI HILLS about 5000 ft. *Hk. f. & Thomson*.

## 4. RUBUS Linn.

Erect sarmentose or scandent shrubs or sometimes creeping herbs, usually prickly. *Leaves* alternate, simple or compound; stipules free or adnate to the petiole. *Flowers* usually in terminal and axillary corymbose panicles less often solitary, white, pink or purple. *Calyx* persistent, deeply 5-cleft, with a broad tube. *Disk* lining the calyx tube. *Petals* 5; stamens many. *Carpels* many, sometimes few on a convex receptacle; style subterminal; ovules 2, collateral, pendulous. *Fruit* a collection of yellow, red, purple or black drupels, crowded upon a spongy or dry, cylindric or conical receptacle.

## I. Leaves simple :—

- A. Creeping undershrub, rooting often at the nodes :—

Leaves orbicular, reniform. .. 1. *R. calycinus*.

- B. Sarmentose, straggling or climbing shrubs :—

1. Leaves lobulate or not lobed at all or with shallow lobes towards the base, longer than broad :—

- a. Base of leaves cuncate, rounded or subcordate, never deeply cordate or hastate :—

- i. Petals present :—

Mature leaves glabrous, caudate acuminate. .. 2. *R. acuminatus*.

Mature leaves pubescent beneath, never caudate acuminate. 3. *R. hexagynus*.

- ii. Petals 0 :—

Mature leaves clothed with hoary tomentum. .. 4. *R. assamensis*.

- b. Base deeply cordate or hastate :—

- i. Leaves white or buff tomentose beneath :—

Leaves never hastate; petiole with weak prickles. .. 5. *R. paniculatus*.

- Leaves ovate cordate  
to hastate; petiole  
with strong recurv-  
ed prickles. .. 6. *R. insignis*.
- ii. Leaves green be-  
neath :—  
Leaves bristly pube-  
scent on the nerves  
beneath; prickles on  
the petiole and mid-  
rib close. .. 7. *R. ferox*.
2. Leaves more or less deeply  
lobed, mostly as broad as or  
broader than long :—  
a. Eglandular :—  
Drupes scarlet. .. 8. *R. moluccanus*.  
b. Branchlets, petioles and  
nerves on the underside  
of leaves with gland  
tipped hairs. .. 9. *R. birmanicus*.
- II. Leaves imparipinnate; leaflets 3-5 :—  
A. Normally 3 leaflets :—  
Shoots with long reddish  
bristles; leaflets tomentose  
beneath. .. 10. *R. ellipticus*.  
Shoots without bristles; leaflets  
glabrous on both surfaces. .. 11. *R. lucens*.
- B. Normal leaflets 3-5 :—  
Branches covered with white  
waxy bloom, glabrous; glands  
0; petals white. .. 12. *R. biflorus*.  
Branches pubescent; gland  
tipped hairs on calyx and  
often on new shoots. .. 13. *R. opulifolius*.
- III. Leaves imparipinnate; leaflets 5-11 :—  
Petals pink; drupes black :—  
Stem often with waxy bloom,  
eglandular. .. 14. *R. lasiocarpus*.  
Petals white; drupes red or orange :—  
Stem with (or without form  
II) gland tipped stiff hairs. .. 15. *R. rosæfolius*.

# 1. *Rubus calycinus* Wall.

A creeping perennial herb with wiry stems often  
rooting at the nodes and slender runners. Branches, petioles  
and undersurface of leaves along the nerves hirsute and with

slender, often recurved prickles. *Leaves* 1.2-5 in. across, orbicular-reniform, obscurely 3-5 lobed, coarsely toothed; upper surface thinly hirsute; base deeply cordate, usually 3-nerved; basal nerves 2 branched from near the origin, subcoriaceous; petiole .7-2.5 in. long; stipules .25-.5 in., broadly ovate, upper narrower, toothed or nearly entire, membranous. *Flowers* 1 in. across, solitary or twin from leaf axils on short 1-2 leaved shoots; bracts paired, similar to the stipules. *Calyx* hairy and densely covered with straight prickles, about .1 in. long; lobes foliaceous, coarsely toothed, .3 in. by .2-.25 in. *Petals* shorter than the calyx lobes. *Fruit* globose about .5 in. across, of a few scarlet drupelets, with long persistent styles; stones rugose.

KHASI HILLS 4500-5500 ft., Cherrapunji, Sohrarim, etc.

Fr. 6.

## 2. *Rubus acuminatus* Sm. *Syr-sym-khlim*, Kh

A climbing shrub with switchy arching glabrous branches; prickles small, curved, often scattered, mostly on stems, few on the petioles. *Leaves* 3.6-5 by .8-3 in., ovate or ovate-oblong or lanceolate, caudate-acuminate, doubly serrate, sometimes undulate, chartaceous; base rounded or cuneate, clothed with a few hairs when young, but soon becoming entirely glabrous, undersurface paler green; lateral nerves 7-10 on either half, lowest from near the base; midrib sometimes prickly; nervules very finely reticulated; petiole slender, .3-.7 in. long; stipules .15-.2 in. long, slender, subulate, early deciduous. *Flowers* white, 2-5 together, corymbose, usually on short peduncles arranged in leafy terminal panicles, up to about a foot long or from upper axils; peduncles up to .4 in. long; bracts subulate, about .1 in. long; pedicels .3-.7 in. long; calyx .3-.4 in. long, often rugose outside; segments .25-.3 in. long, lanceolate, with hooked or recurved often dorsal tips, adpressed pubescent within, erect in fruit. *Petals* .2-.25 in. long, elliptic-oblong. *Stamens* numerous. *Carpels* glabrous or thinly pubescent; receptacle villous with long erect hairs. *Fruit* scarlet, of large drupels; stone rugose.

KHASI HILLS, 4500-6000 ft.

Fr. 8-9. Fr. 10-11.



**3. *Rubus hexagynus* Roxb.** *Soima-joth-let*, Mech.; *Thik-chambak*, *Nachhu-agam*, Garo; *Asari-kanta*, Nep.; *Naga-jejeru*, Ass.; *Sebi-mepung*, Duff.; *Si-um*, Kh.; *Mahui*, Lush.

A spreading woody climber; branchlets tomentose or pubescent with numerous prickles, flattened at the base; young parts villous. *Leaves* 3-4.5 by 1.2-2.2 in., oblong, oblong-lanceolate to ovate-lanceolate, acute, shortly acuminate or obtuse, closely serrate; base subcordate or rounded, coriaceous, glabrous with age above, except along the midrib and sometimes along the nerves, pubescent beneath, specially along the nerves; midrib usually with a few weak prickles; lateral nerves 7-11 on either half, arched, ending in serratures, prominent beneath; nervules finely reticulated; petiole .2-.3 in. long, tomentose; stipules pectinate, about .4 in. long including the terminal segments, pubescent or puberulous; segment about .2 in. long. *Flowers* white in ample tomentose terminal panicles, the lower branches from leaf axils; pedicels .15-.25 in. long, grey, pubescent; bracts .15-.2 in., pectinate; segments up to .1 in. *Calyx* grey pubescent, about .25 in. long. *Calyx-tube* glabrous within; lobes about .15 in. long, lanceolate or ovate acute; tip sometimes minutely 2-3 cleft, villous within, but glabrous along an ovate patch towards the base; petals linear oblong, shorter than the calyx lobes. *Stamens* numerous. *Carpels* glabrous, about 6 on a short, hairy receptacle. *Ripe drupels* .25-.3 in. long, red, ultimately black when ripe; stone .2 in. long, reticulately pitted.

KHASI HILLS, up to 4500 ft., LAKHIMPUR, DARRANG, SIBSAGAR, GARO HILLS, CACHAR, GOALPARA, SYLHET.

Flrs. 10. Fr. 11-1.

***Rubus Hamiltoni* Hk. f. Syn. *R. pyrifolius* Ham.**

A very similar climber to *R. hexagynus* and probably only a variety. *Branchlets* glabrate. *Leaves* 3-6 by 1.2-1.7 in., lanceolate or oblong-lanceolate, acuminate, (usually longer than in the last species), closely serrate, coriaceous; base rounded or subcordate; midrib prickly; lateral nerves 7-10; pedicels .2-.3 in. long, pubescent; stipules as in the last species. *Panicles* not densely pubescent; pedicels slender, .2-.25 in. long, pubescent; bracts up to about .4 in. long, pectinate, longer than the buds; segments setaceous, up to .3 in. long. *Calyx* about .3 in. long, adpressed-pubescent outside, glabrous within; lobes lanceolate, cuspidate-acuminate; tip cleft into minute setaceous segments,

villous within except for an ovate patch at the bottom. *Petals* white, shorter than the calyx lobes. *Stamens* many; carpels 6 on a hairy receptacle. *Fruit* as in the last species.

SIBSAGAR and probably in other Districts.

This plant usually dries brown whereas *R. hexagynus* dries grey but this character can hardly be used for separating the two, as I have undoubted specimens of *R. hexagynus*, which have dried brown. The other characters by which it differs are its less tomentose branches and inflorescence narrower and longer acuminate leaves, much larger bracts with much finer and longer segments and the setaceous segments of the apex of the calyx lobes.

**4. *Rubus assamensis* Rocke.** *Soh-churia, Soh-nybat, Kh.; Jermat-che, Shi-larnai*, Synt.

Large spreading subscandent shrub; branchlets, inflorescence and petioles villous with spreading hairs. *Prickles* recurved, small. *Leaves* 2-4 by 1-2 in. oblong or ovate-oblong, often obscurely lobed, shortly acuminate, unequally toothed, glabrescent above with age except along the nerves, undersurface felted with white wool, except along the nerves, which are clothed with spreading hairs; lateral nerves 5-6 on either half, very oblique, excurrent into teeth; base cuneate to rounded or subcordate; petiole .15-.25 in. long; stipules .4-.5 in. long, pectinately pinnatifid, hairy. *Flowers* white .2 in. long in ample conical terminal panicles, lower branches of which arise in leaf axils; pedicels about .25-.3 in. long, slender. *Bracts* about .2 in. long, subulate from half way down cut into small setaceous segments; bracteoles small, subulate. *Calyx* densely felted with silvery white wool and spreading hairs outside; segments ovate-acuminate, glabrous within except at the apex and along the margins. *Petals* 0. *Carpels* 10-22, glabrous or with few long hairs; styles long. *Fruit* hardly exceeding the calyx, globose; drupes few, large; stone pitted; receptacle villous.

KHASI HILLS 56000 ft.

Fls. 5-6. Fr. rainy season.

**5. *Rubus paniculatus* Smith.**

A large rambling shrub often with dark purplish-brown stems; twigs, petioles, undersurface of leaves and inflorescence white or buff tomentose; prickles few, small, hooked;

glands and bristles absent. *Leaves* 3-6 by 2.5-3.5 in., broad-ovate, cordate, acuminate, often obscurely lobed, irregularly serrate, upper surface clothed with deciduous tomentum when young; base 3-5 nerved; petiole 1-2 in. long; stipules small, laciniate. *Flowers* white, .7-1 in. across in much branched lax terminal panicles, 4-12 in. long, the lower branches from upper leaf axils; bracts small; pedicels .2-1 in. long. *Calyx lobes* .3-.4 in. long, ovate-lanceolate, often caudate-acuminate, erect or reflexed in fruit. *Petals* .2-.3 in. long, shorter than the calyx lobes. *Carpels* glabrous. *Fruit* .5-.7 in. long, exposed; drupes black, large, glabrous, succulent; receptacle villous; stone rugose.

KHASI HILLS, 4-5000 ft. *Hooker*.

I have not come across any specimens from our area.

Fls. 4-6. Fr. 6-7.

# 6. *Rubus insignis* Hk. f. *Bor-sereli-kanit*, Ass.

A large rambling scandent shrub, clothed with the exception of the upper surface of leaves with buff cottony tomentum and also with spreading hairs; glands and bristles absent; prickles hooked, small. *Leaves* 4-9 by 3.5-5 in., ovate-cordate to hastate, lobulate, shortly and often rather abruptly acuminate, closely toothed, thin but tough, glabrate with age above; base 3-5 nerved; midrib prickly; the lateral nerves (above the basal pair) 8-12 on either half, sometimes with a few prickles; petioles 1-2 in. long, densely prickly. *Flowers* white, .5 in. across in lax terminal panicles, armed with minute prickles, lower branches arising from upper leaf axil; pedicels up to .4 in. long, very short in forms with crowded flowers; bracts about .15 in. long, linear, often shortly 3-fid at the apex. *Calyx* densely buff-tomentose; lobes .2-.3 in. long, oblong-lanceolate or lanceolate, pubescent within, apex sometimes minutely 2-3-fid into setaceous segments. *Petals* white, obovate, equalling or shorter than the calyx lobes. *Carpels* numerous, glabrous. *Fruit* black; drupes acid; receptacle villous.

DARRANG, Charduar Reserve (Belsiri); KHASI HILLS, probably in other Districts also.

Superficially similar in many respects to *R. paniculatus*, but more robust in all its parts except the flowers.

Flowers according to elevation 1-4. Fr. 5-6?

**7. Rubus ferox** Wall Cat. 724.

A spreading climbing shrub; twigs tomentose; prickles short, hooked, glandular hairs absent. *Leaves* 3-5 by 2-4 in., upper ovate; lower more orbicular in outline, acuminate, often shortly 7 lobed, acute or subobtuse, sharply toothed, thin; base cordate, harsh pubescent along the midrib and often along the nerves above, undersurface green, (not buff or white) with bristly hairs along the nerves; midrib usually prickly, sometimes with weak prickles on the other nerves; basal nerves ordinarily 5; lateral nerves 4-7 above the basal; petiole 1-2-3 in. long with numerous prickles; stipules pectinately pinnatifid as are also the bracts. *Flowers* about .7 in. across, white in lax panicles with slender ramifications. *Calyx* tomentose outside; lobes ovate or deltoid, often with laciniate segments on the margins, erect in fruit. *Petals* as long as the calyx lobes. *Filaments* hairy. *Carpels* many; drupes many; stones rugose.

N. E. FRONTIER—near Sadiya, KHASI HILLS, Sohra—*Clarke*, Musmai,—*Clarke*.

Flrs. 8-11.

**8. Rubus moluccanus** Linn. Vern. *Jutulipoka*, Ass. (Sibsagar); *Thekhi-sambak*, Garo; *Pingta-Taru*, Duff.; *Inshun-arang-kang-arong*, Mech.; *Sumahar-arikang*, Mik.; *Setai-selu*, Nep.; *Kukur-khata*, *Shumu-kam-khaseba*, Kach.; *Artheimu-chinjat*, Kuki; *Soh-nybbah*, Kh.; *Sa-shei*, Synt.

A straggling or subscandent shrub; stems from about 4 ft. to 20 ft., in robust forms; eglandular; young shoots at first whitish or fulvous, silky villous, later on tomentose, often mixed with longer hairs. *Prickles* hooked and short or in some forms straight and strong attaining .25 in., scattered over the branches, petiole, midrib and sometimes on the nerves. *Leaves* very variable in size, pubescence and texture 2-8 in. long, as broad as or slightly longer than broad, broadly ovate or rotundate in outline, 3-7 lobed; lobes rounded to acute or acuminate, inequally serrate-dentate; base cordate or retuse, usually 5-nerved, rugose between the nervules, scabrid or nearly smooth and thinly pubescent, sometimes hirsute or glabrate above, undersurface buff or

greyish tomentose and with spreading hairs on the nerves or hairy along the nerves only; lateral nerves 3-5 above the basal; petiole .6-4 in. long, buff or greyish tomentose, hirsute or pubescent; stipules very variable, leafy and ovate-lanceolate or oblong with incised margins or pinnatifid to lacinate, .3-1 in. long, pubescent or tomentose. *Flowers* white, .5-1 in. across, in short few flowered axillary racemes or in contracted terminal panicles. *Inflorescence* villous with silky buff, rarely grey tomentum or sometimes hirsute. *Pedicels* .3-.5 in. long; bracts from .2-1 in. long, resembling the stipules or elliptic to orbicular and sometimes almost entire. *Calyx* densely fulvous or grey silky also with short tomentum; lobes .3-.6 in. long, ovate to lanceolate, acuminate, entire or cleft at the apex or with few teeth or setaceous incisions on the upper half, adpressed pubescent within, erect or ultimately more or less spreading in fruit. *Petals* shorter than the calyx lobes, white, obovate. *Stamens* numerous, glabrous. *Carpels* many, glabrous. *Fruit* globose, .4-.6 in. across, in some forms longer than the calyx. *Drupe* scarlet, succulent; stone rugose with fine dorsal subparallel, ridges and minute pitted reticulations, receptacle villous.

Practically all over ASSAM, ascending to 6500 ft. in the KHASI HILLS.

The fruit is eaten and the juice of the roots is used as a medicine for fistula.

Flrs. & Fr. according to elevation from 1-12.

The high level subsacendant forms flower and fruit from April to October.

I am unable to find any constant characters by means of which the robust forms of this species could be separated from *R. reticulatus* Wall Cat.

The various forms of this very variable plant are almost impossible to separate as they merge into one another. The forms found in our area may be tentatively grouped as follows :—

Form I. Leaves small to medium sized, longer than or as long as broad; lobes subacute rounded or obtuse; petiole with strong or weak prickles. *Flowers* small to medium sized. *Sepals* and bracts cut up at the tip or almost entire, .2-.4 in. long. Fr. small. Weak straggling shrub up to about 4 ft.

Form II. Low spreading shrub; stem sometimes rooting at nodes; branchlets hirsute. *Prickles* straight or slightly hooked, strong, sharp. *Leaves* medium sized to large, thinly hirsute above; nerves on the

undersurface clothed with rather stiff hairs, space between the nervules glabrous or tomentose; teeth very fine, crowned with tufts of hairs; lobes acute. *Petiole* with strong, nearly straight prickles; stipules .5-.8 in. long, usually laciniate; segments plumose with spreading hairs. *Flowers* .5-.6 in. across; bracts laciniate or pectinate at the apex. *Calyx* lobes usually with few green setaceous segments at the apex. A noticeable form. In shady situations often near water.

Flrs. & Fr. 6-9.

Form III. Straggling shrub, often very robust; stem attaining about 25 ft., in favourable situations. *Prickles* on stem short. *Leaves* as broad as long or longer, mostly large, rugose to nearly smooth above; lobes acute or acuminate, coriaceous to thin; petioles with few or many prickles; stipules foliaceous, variously incised. *Flowers* medium sized to large; bracts orbicular or elliptic to ovate in outline, usually incised, sometimes entire. *Fruit* often large.

KHASI HILLS 5000-6500 ft.

Flrs. & Fr. 5-10.

### 9. *Rubus birmanicus* Hk. f.

A straggling shrub with wiry stems; branches, petioles, nerves on the underside of leaves and stipules clothed with numerous, flexuous bristly hairs; prickles scattered, hooked with flattened base or straight. *Leaves* usually 5, sometimes 7 lobed; lobes acute, acuminate or subacute; teeth unequal, sharp, membranous; base deeply cordate, 5 nerved, thinly hairy or glabrate above, buff or pale brownish tomentose beneath; petiole 1.5-2.5 in.; stipules .6 by .4-.5 in. long, cut up into many capillary segments. *Flowers* large in panicles with short branches; bracts similar to the stipules. *Calyx* tomentose (but not hairy). *Calyx lobes* subacute. *Petals* white, equalling the calyx lobes, orbicular, clawed. *Stamens* very numerous. *Carpeis* many, glabrous; receptacle villous.

KHASI HILLS 5-6500 ft., also GARO HILLS, sheet No. 5336 if the identification of this sheet which is incomplete is correct. The description of floral parts has been based on F. B. I.

10. *Rubus ellipticus* Smith. Vern. *Jotelu-poka*, Ass.; *Shumu-mukram*, Kach.; *Arthei-mu*, Kuki; *Sia-soh-pru*, Khasi; *Sohchi-u-sow*, Sashi, Synt.

A large straggling shrub, with flexuous branches; branchlets angled, shaggy with long reddish bristles often also with

a few glandular hairs; prickles stout, hooked or slightly curved at the tip. *Leaves* pinnately 3-foliolate, lower ones sometimes 1-foliolate; rachis 1-3 in. long, prickly on the underside also shaggy with bristles; stipules 2-2.5 in. long, subulate. *Leaflets* 1.2-4 in. long, and as broad or nearly so, terminal largest, broadly obovate, elliptic or orbicular; apex retuse or abruptly acute, closely serrate, dark-green and glabrate above, pale and usually tomentose beneath; lateral nerves 7-9 on either half; petiolules of lateral leaflets very short. *Flowers* 3-6 in. across, white, crowded in short terminal leafy panicles and also in short racemes from upper leaf axils; pedicels 1.5-3 in. long, grey tomentose; bracts small, subulate. *Calyx segments* 2-2.5 in. long, ovate or elliptic-oblong, mucronate or acute, tomentose or pubescent on both surfaces. *Petals* white, obovate, exceeding the calyx-segments. *Stamens* in one series. *Carpels* silky. *Fruit* 4-6 in. across, orange-yellow; drupes succulent, crowded, receptacle tapering upwards, villous; stone rugose.

SIBSAGAR—*Kuji-bali*, GARO HILLS, N. CACHAR HILLS, KHASI HILLS—up to 6500 ft., sometimes gregarious in openings, usually in hilly country from 2000 ft. upwards.

The fruit has an excellent flavour and is much eaten wherever found.

Flrs. 2-3. Fr. 5-6.

**11. *Rubus lucens* Focke.** Vern. *Jejeru-poka*, *Noga-jhejhelu*, Ass.; *Sum-hal*, Mik.

A stout scandent shrub, climbing tall trees; young parts puberulous, soon becoming glabrous; branches angled, grooved. *Prickles* small, hooked, scattered. *Leaves* pinnately 3-foliolate; rachis 1.7-4 in. long, usually prickly, glabrous or nearly so with age; common petiole 1.5-2.5 in. long; stipules linear. *Leaflets* 2.5-5.5 by 1.3-3 in., elliptic, ovate-elliptic to ovate-lanceolate, shortly caudate-acuminate, sharply and somewhat distantly serrate; base rounded to acute, coriaceous, glabrous, shining above, paler beneath; lateral nerves 8-10 on either half; tertiaries subparallel, ultimate reticulations extremely fine; petiolules of lateral leaflets 1-1.5 in. long. *Flowers* 3 in. across on short pubescent corymbose racemes or sometimes in clusters, arranged on the

branches of lax terminal panicles, the lower branches arising in leaf axils; pedicels .2-.3 in. long, thinly pubescent; bracts about .1 in. long, subulate or linear spatulate. *Calyx* very deeply lobed; base of calyx tube sometimes rugose with age; segments .15-.2 in. long, oblong, acute or obtuse, usually mucronate, erect in fruit, densely hoary tomentose, except towards the base outside, adpressed silky pubescent within. *Petals* nearly equalling the calyx segments, "white or pink"—*Hooker*, obovate, clawed. *Stamens* 20-30. *Carpels* few, hirsute. *Fruit* enclosed in the calyx; drupes varying from six to eighteen, juicy, red; stone rugose; receptacle pubescent.

KHASI HILLS and also N. ASSAM.

Fl. & Fr. 10-2.

## 12. *Rubus biflorus* Buch-Ham.

A large straggling shrub, often gregarious in openings; branches purplish, glabrous, covered with a white waxy bloom giving the plant a "white washed appearance." *Prickles* stout, up to .3 in. long with a broad compressed base, straight on the branches, hooked on young shoots and leaf rachis. *Leaves* (1)-3-5 foliolate. *Rachis* prickly, glabrous or pubescent, sometimes also with very short glandular hairs, .7-3.5 in. long; stipules about .2 in. long, subulate or linear, the terminal leaflet largest, 1.3 by .8-2 in., ovate to lanceolate or rhomboid in outline, mostly lobed, sometimes with subcordate base; the lateral leaflets .8-2.5 by .4-1 in., sessile, lanceolate to ovate, all inciso-serrate, thinly pubescent or glabrate above, white woolly tomentose beneath; midrib often with few weak prickles. *Flowers* white, .5-1 in. across, drooping, solitary and axillary or in umbellate cymes at the ends of lateral branches or from leaf axils; pedicels glabrous, pruinose, .4-1 in. long, slender. *Calyx* divided deeply; lobes about .2-.3 in. long, ovate lanceolate, apiculate, erect or spreading, ultimately reflexed in fruit, pruinose, glabrous or tomentose along the margins outside, adpressed pubescent within. *Petals* obovate or suborbicular, equalling or exceeding the calyx lobes. *Carpels* woolly towards the top. *Fruit* .4-.6 in. across, globose, orange or yellow; styles usually collected together towards the apex and falling off in a piece; drupes juicy, palatable, glabrous or floccose, woolly



on the inner face; seeds reticulate pitted; receptacle rugose and densely or sparsely woolly.

KHASI & JAINTIA HILLS 5500-6500 ft., Laitkor Forests. Peak Forests etc.

Flrs. 4-5. Fr. 5-6.

Flowers. & Fruits are borne ordinarily on short lateral shoots bearing leaves with 3 leaflets.

### 13. *Rubus opulifolius* Bertol.

A straggling shrub; young parts, rachis and inflorescence softly white or greyish tomentose; new shoots often with gland tipped hairs. *Prickles* few, up to .1 in. long, hooked or straight with a flattened base. *Leaves* 3-5 foliolate with few prickles on the back; stipules subulate or linear, .15-.25 in. long. *Terminal* leaflet largest, 1.2-2.5 by 1.2 in., usually irregularly lobed, ovate to ovate-rhomboid in outline; lateral leaflets .7-2 by .5-1.3 in., elliptic to lanceolate, often somewhat oblique at the base, crenate-serrate, acute-acuminate, sometimes subacute, soft, dull green and softly hairy or glabrescent above, clothed beneath with matted wool except on the nerves, which have spreading yellowish hairs; lateral nerves 5-7 on either half, lowest pair from the base; pedicels of lateral leaflets very short. *Flowers* .5 in. across in short congested tomentose racemes up to .7 in. long terminating lateral branches or a few flowers from upper axils; bracts tomentose, subulate or linear up to .25 in. long; bracteoles setaceous, very small; pedicels .15 in. long, stout with or without glandular bristles, elongating in fruit. *Calyx* densely tomentose and with gland tipped bristles outside; lobes about .25 in. long, lanceolate or ovate, acuminate, adpressed silky within. *Petals* about .2 in. long, deep pink, broadly obovate, suborbicular, clawed, erose. *Stamens* numerous; filaments pinkish. *Carpels* clothed with silky hairs. Fruit globose, about .3-.4 in. across; drupels orange or yellow tipped with black, large, succulent; stone pitted, receptacle short, hairy.

KHASI HILLS, usu lly 5500-6500 ft.

Apt to be mistaken for *R. biflorus* from which it can be easily distinguished by its smaller and fewer prickles, glandular calyx and shoots and its fruits with prominently persistent styles.

**14. *Rubus lasiocarpus* Smith.** *Shumugam-gamphu, Dieng-soh-khao-iong, Sia-soh-khaw-iong, Kh.; Soh-chi-iong, Sa-kho-iong, Synt.*

A large spreading shrub; branches long, often pruinose, glabrous with age, usually purplish below the bloom; young parts tomentose. *Prickles* stout, hooked or straight, up to .4 in. *Leaves* 5-7, sometimes only 3 or up to 11 foliolate, 3-10 in. long; rachis usually with hooked prickles, tomentose or glabrate with age; stipules .2-.3 in. long, subulate. *Leaflets* 1-4 by .4-2.5 in., terminal often broadest and lobulate, ovate, elliptic or ovate lanceolate, acuminate, acute or subacute, simply or doubly cuspidate, toothed or serrate, subcoriaceous, glabrous or pubescent above, thickly white tomentose beneath; lateral nerves 7-10 on either half, impressed above, prominent beneath, close, straight. *Flowers* .3-.7 in. across, purplish-pink, in terminal and axillary, simple or paniced lax, tomentose corymbs; pedicels of various lengths, usually .1-.25 in. long; bracts linear, small. *Calyx* densely woolly; lobes about .2 in. long, ovate or ovate-lanceolate, acuminate. *Petals* pink or purple pink, obovate or sub-orbicular, usually shorter than the calyx lobes. *Carpels* tomentose, many. *Fruit* .3-.5 in. across; drupes succulent, black when ripe with glaucous bloom, receptacle villous, columnar; stones pitted.

GARO HILLS, N. CACHAR HILLS, KHASI HILLS, usually above 2000 ft., ascending to 6500 ft., often along nalas and streams in low elevations, but by no means confined to such situations in cooler places.

The ripe fruit is sweet and has a delicate flavour. It is much eaten and is also used for jellies and jams wherever available in sufficient quantities. The fruit is however frequently attacked by insects when about to ripen.

Flrs. 3-4. Fr. 5-7.

The flowers and fruits are borne mostly on lateral branches which are borne in leaf axils in the second year on new shoots.

**15. *Rubus rosæfolius* Smith.** *Soh-sherria, Dieng-soh-bhoroya, Kh.*

A straggling or procumbent shrub; young parts, leaf rachis and inflorescence villous to glabrous, with short or

long, spreading, stiff, purple gland tipped hairs. *Branchlets* green. *Prickles* numerous, sharp, nearly straight with flattened base on older branches, hooked on shoots, leaf rachis and inflorescence. *Leaves* imparipinnate, 5-9-(11) foliolate, often reduced in number at the ends of branches, sometimes to a single leaflet near the inflorescence. *Rachis* of normal leaves 2-6 in. long; stipules .2-.3 in. long, linear-lanceolate. *Leaflets* .6-2.2 by .3-1.2 in., terminal usually largest and often lobed, ovate to oblong-lanceolate, doubly inciso-serrate, acuminate or acute; base rounded or cuneate, membranous, green on both surfaces, glabrate above, pubescent, sometimes mixed with glandular hairs beneath on the nerves; midrib often prickly; lateral nerves 9-14 on either half, nearly straight, subparallel; petiolules of lateral leaflets very short. *Flowers* white, .7-1 in. across, terminal or axillary, solitary on stalks, .4-2.2 in. long or in lax panicles. *Bracts* resembling the stipules. *Calyx* deeply cleft with or without glandular hairs outside; segments .3-.4 in. long, ovate-lanceolate or oblong, gradually or abruptly caudate-acuminate, reflexed in fruit, glabrate or tomentose along the margins outside, clothed within, except sometimes at the base with dense felted tomentum. *Petals* about as long as or slightly longer than the calyx lobes, obovate or suborbicular, clawed. *Stamens* many. *Carpels* very numerous, glabrous on a villous receptacle. *Fruit* .5-.6 in. long, cylindric or oblong or (in form I) globose and up to .7 in. across. *Drupe*s numerous, small and somewhat dry or succulent and large, orange, yellow or scarlet; seeds rugose.

LAKHIMPUR—Dulong-mukh, GOALPARA—North Sidli Line; N. CACHAR HILLS, KHASI HILLS up to 6500 ft., probably also in other submontane tracts.

Fls. 2-8. Fr. 3-10, according to altitude.

The above description includes the following varieties:—

**Var. *Sorbifolius*.** *R. Sorbifolius* Max. Glandular hairs on branchlets long persistent, spreading. *Calyx* densely clothed with glandular hairs. *Fruit* cylindric; drupes very small, almost dry, tasteless, orange or yellow when ripe.

**Var. nov. *rubrocarpa*;** branchlets without or with very few glandular hairs, secondary nerves of leaflets close. *Flowers* and *fruits* larger than in the last variety. *Calyx* without glandular hairs outside. *Fruit* globose to oblong; drupes scarlet when ripe, succulent, edible.

The flowers and fruits are usually borne on short lateral branches, which appear in the second year on the axils of new shoots. The leaves on these lateral branches have mostly 3 leaflets.

**KHASI HILLS**—Peak forests—6500 ft., also **LAKHIMPUR**.

The above varieties differ so markedly in their fruits, habits and indumentum that it is probable that we are dealing with two species.

The following variety occurs as an escape in Lakhimpur District and also at Cherrapunji.

Var. *coronarius*, *Rubus sinensis* of horticulturists. A small shrub covered specially on the leaves with minute scales. *Leaflets* 3.5-7 in., terminal sometimes lobulate, 1.2 by .4-1 in., green on both surfaces. *Flowers* white, about 1.2 in. across; double stamens being mostly transformed to petals resembling a small rose. *Carpels* with a few hairs at the top. *Fruit* not known in our area.

Native country unknown—probably S. E. ASIA.

Fls. almost all the year round.

The following may be mentioned :—

### 1. *R. khasianus* Card.

A shrub, prickles few, recurved. *Leaves* simple, long petioled; petioles 2.6-3.4 in. long, villous, sparsely aculeate. *Blade* 4.7-5.9 in. by 4.3-5 in., ovate-cordate, 5-lobate, terminal lobe longest, lobes acute, sinuate, more or less toothed, upper surface somewhat rugose with scattered tubercles; nerves pilose, undersurface paler. *Stipules* palmately dissected. *Flowers* in short, axillary or terminal racemes, about 4 in. across; pedicels short, villous; bracts similar to the stipules, apex cut up into narrow segments. *Calyx* campanulate, villous with yellowish silky hairs, segments tomentose within, outer 3, inciso-dentate, inner two subentire. *Petals* white (?), suborbicular, shortly clawed. *Stamens* in many series, apex of connective with few harsh hairs. *Carpels* glabrous; style filiform, glabrous. *Fruit* not known.

**KHASI HILLS** 3-5000 ft.—*Hk. f. & Thomson No. 467*.

### 2. *Rubus* sp. near *R. cartægifolius* Bge.

A gregarious undershrub about 3 ft. high, armed with sharp close prickles. *Leaves* longer than broad, lobed, acuminate, unequally serrate, glabrous or nearly so, midrib prickly. *Fls.* & *Fruit* not seen.

In the absence of flowers and fruits it has not been possible to determine the position of this very interesting plant. Probably introduced. Government orchard, Shillong.

### 3. *R. Burkillii* Rolfe.

A straggling shrub, armed with sharp recurved prickles. *Leaves* simple, 2-4 in. long, broadly ovate to suborbicular in outline, about 5-nerved at the base, somewhat irregularly 3-5 lobed, lobes often rounded, inciso-crenate, hairy along nerves on both surfaces; petioles .5-1.5 in. long; stipules narrow-laciniate. *Flowers* white, 3-7 together, often subcorymbose on short terminal or axillary racemes; pedicels

·2·25 in. long, pubescent. *Calyx* lobes about ·2 in. long, acute, with few lateral segments, thinly pubescent outside. *Petals* obovate, ·2·24 in. *Drupe*s few, bright red.

Kobo—Abor Hills.

Fr. 12.

A scandent *Rubus* agreeing in many respects with the above plant has been collected in Mamloo-Khasi Hills (sheet 9363). It may prove to be a local form of the species. It differs from *R. Burkillii* by:—

- (i) its narrower leaves which are longer than broad, sharply acuminate, the lobes being irregular sometimes, completely dividing the leaf into 2 leaflets or almost absent in the upper leaves.
- (ii) more robust corymbs;
- (iii) more densely pubescent calyx with larger number of lacinate lateral segments on the lobes;
- (iv) more succulent drupes.

It is also less prickly on the whole than *R. Burkillii*.

Flrs. & Fr. 9.

#### ***Fragaria indica* Andr.**

A silky pubescent herb with perennial rootstock and slender runners. *Leaflets* usually digitately 3-foliolate; stipules foliaceous, adnate to the slender petiole, 1·5 in. long. *Leaflets* 1·1·5 in. long, obovate, toothed; base cuneate, nerves subparallel. *Flowers* yellow, ·5·1 in. across, solitary on long axillary peduncles equalling the petioles. *Calyx* persistent with 5 long bracteoles exceeding the lobes. *Petals* 5, obovate. *Stamens* many, persistent. *Carpels* many on a convex receptacle. *Fruit* of numerous minute black, achenes on a fleshy red receptacle, spherical, insipid.

Submontane tracts ascending to 6000 ft. in the KHASI HILLS, often covering sheltered banks.

Flrs. & Fr. almost throughout the year.

#### ***Fragaria nilgerrensis* Schdl.**

A stouter herb than the last with perennial rootstock and long runners clothed with long spreading hairs. *Leaves* digitately 3-foliolate; petiole up to 5·5 in. long with more or less sheathing base; stipules adnate to the base of the petiole, broad with scarious margins. *Leaflets* 1·1·5 in. by ·8·1·2 in. obovate, lateral usually oblique, coarsely and sharply toothed, margins pilose, undersurface densely pubescent, nerves prominent beneath. *Flowers* white, ·5·1 in. across, few cymosely arranged on a stout peduncle; pedicels ·8·1·2 in. long. *Calyx* lobes spreading, ovate acuminate; bracts 5, persistent, smaller than the calyx lobes and alternating with them, lanceolate, often cleft at the apex. *Petals* obovate, exceeding the calyx segments. *Stamens* and carpels

many. *Fruit* up to .7 in. across, white with pinkish tinge, subacid; achenes reddish-brown, minute, imbedded in the fleshy receptacle.

KHASI HILLS 5-6500 ft.

The fruit is eaten but is inferior to the wild straw berry of N. W. Himalayas, *F. vesca* Linn.

**Potentilla Mooniana** Wight. Vern. *Lyngniang-masi*, Kh.

A prostrate or erect hirsute or villous herb with perennial rootstock. *Leaves* 1.5-6 in. long or longer, interruptedly pinnate, larger leaflets alternating with one or more pairs of very small leaflets; rachis silky; stipules membranous or foliaceous. *Leaflets* many, sessile, larger .4-1.5 in. long, elliptic to oblong, smaller, orbicular to cuneate, .1-.4 in. long, all inciso serrate, clothed with spreading hairs beneath. *Flowers* yellow, .3-.5 in. across on congested corymbs or lax panicles with long pedicels. *Calyx* lobes 5, villous, alternating with 5 deeply toothed, more or less lobed bracts. *Petals* 5, obovate-orbicular. *Stamens* many. *Carpels* free, many; style ventral. *Fruit* of minute, smooth, achenes on an elevated hairy receptacle.

KHASI HILLS 4-6500 ft.; common.

The roots are chewed with pan.

Flrs. & Fr. 2-10.

**Potentilla fulgens** Wall. Vern. *Lyngiang-bru*, Kh.

A prostrate or erect herb attaining 24 in. in height with a stout rootstock, clothed on the stem, inflorescence and leaf rachis with soft spreading hairs. *Leaves* interruptedly pinnate as in the last species, 2-6 in. long; stipules membranous to sessile, foliaceous; leaflets many, sessile, extending to the base of the rachis, larger leaflets .4-1 in. long, obovate to elliptic, smaller, .1-4 in. long, obovate to orbicular, all coarsely serrate, lateral nerves often impressed above, sub-parallel, undersurface villous with silvery white hairs. *Flowers* yellow, .3-.5 in. across, in lax terminal corymbose panicles or congested corymbs. *Calyx* lobes with long spreading hairs; bracts smaller, silvery, entire or lobed. *Stamens* and carpels many. *Achenes* on an elevated villous receptacle.

KHASI HILLS—5-6500 ft., sometimes gregarious, in recent clearances.

Flrs. & Fr. 5-9.

**Potentilla Kleiniana** W & A.

An annual with many slender prostrate hairy stems. *Leaves* digitately 3-5 foliolate; petiole slender, those of radical leaves long, others short; stipules .2-.5 in. long. *Leaflets* obovate or oblanceolate, .3-2 in. long, obtusely toothed. *Flowers* yellow, about .25 in. across, pedicellate in terminal cymes. *Petals* scarcely exceeding the calyx. *Achenes* with sub-parallel wrinkles along the length.

KHASI HILLS 4-5000 ft.

**Agrimonia Eupatorium** Linn. Vern. *Lynniong-tyinning*, Kh. The Agrimony.

An erect leafy herb with a perennial and more or less woody rootstock, clothed with spreading soft hairs. *Leaves* 2·5-7 in. long, interruptedly imparipinnate with very small leaflets between larger ones; stipules partly adnate to the rachis, large foliaceous up to 1 in. long. *Leaflets* 7-21, sessile, larger 1·3 in. long, obovate to elliptic or lanceolate, smaller 1·3 in., cuneate or orbicular, all coarsely toothed, pubescent on both surfaces. *Flowers* about 25 in. across, yellow, in elongate, terminal, spike-like racemes; pedicels short with 1-3 cleft or fid; bracts ovate acuminate in outline; bracteoles 2. *Calyx tube* 1·2 in. long, turbinate, villous, grooved, somewhat enlarged and hardened in fruit, top of tube with a dense ring spines, which become hooked in fruit; lobes 5, elliptic to oblong lanceolate, imbricate in bud. *Petals* 5, oblong-obovate, about 1 in. long, much exceeding the calyx lobes. *Stamens* about 15, inserted at the mouth of the calyx tube. *Carpels* 2, included in the calyx tube. *Fruit* of 1 or 2 achenes, enclosed in the spinous calyx tube.

KHASI HILLS 4-6000 ft.

Flrs. 4-10.

**Poterium longifolia** Betrol. Vern. *Bat-tari*, Kh.

A somewhat stiff glabrous herb attaining up to 4 ft., with many branches and stout rootstock. *Leaves* pinnate, 5-16 in. long; stipules adnate to the base of the sheathing petiole, upper foliaceous; leaflets petiolate, 7-3 in. long, linear oblong, crenate, rigid, nerves prominently reticulate beneath. *Flowers* purple, about 12 in. long, bracteate and 2-bracteolate, subsessile, collected together in panicle spike-like heads, 7-2·5 in. long with slender stiff peduncles. *Calyx tube* persistent, compressed, pubescent; lobes 4, in opposite pairs of which one is broader than the other, thickened towards the tip, which is notched and with a mucro in the notch, back with a few hairs. *Petals* 0. *Stamens* 4, with slender filaments. *Disk* closing the mouth of the calyx tube. *Carpel* 1, enclosed in the calyx tube. *Fruit* of 1 achene enclosed in the hardened shortly 4 winged calyx tube.

KHASI HILLS in fallow lands—5-6000 ft.

Flrs. 8-10.

## 5. SPIRÆA Linn.

**Spiræa callosa** Thunb. Vern. *Soh-Byrthit*, Kh.

An erect or straggling shrub attaining about 7 ft. in height; branchlets pubescent; young parts grey tomentose. *Leaves* alternate, 8-2 by 4-8 in., ovate oblong to oblong lanceolate or lanceolate, sometimes rhomboid-lanceolate towards the ends of the branches, acute, doubly inciso-serrate; base cuneate, thinly pubescent and ultimately glabrate above,

glaucous and pubescent along the nerves beneath, chartaceous; main lateral nerves 7-9 on either half, prominent beneath, nervules finely reticulated; petiole very short, pubescent; stipules minute, caducous. *Flowers* hermaphrodite, white, often with a touch of pink about .2 in. across in compound, spreading, corymbose, cymes terminating branches. *Pedicels* up to about .1 in. long; bracts linear-lanceolate to spatulate, up to .25 in. long; bracteoles about as long as the calyx, both long persisting. *Calyx* pubescent, about 1 in. long, persistent. *Calyx-tube* obconic, lobes 5, triangular-ovate, reflexed in fruit. *Petals* 5, nearly .1 in. long, orbicular; stamens many. *Disk* lining the calyx tube and ending in a prominent glandular ring. *Carpels* 5, free, villous on the inner face; ovules shining; styles subterminal. *Fruit* of 5, shining follicles, about .1 in. long, thinly hairy or glabrous.

KHASI HILLS about 6000 ft.

Flrs. 6-8. Fr. 8-10.

*Spiræa cantoniensis* Lour. Syn. *S. corymbosa* Roxb.

A branchy and straggling shrub with purplish or greenish-brown glabrous branchlets. *Leaves* .8-1.5 by .3-.5 in., ovate-oblong to rhomboid, subacute, inciso-serrate on the upper half, entire towards the cuneate and often subtriplinerved base, glabrous above, undersurface glaucous; lateral nerves ascending, straight; petiole .15-.2 in. *Flowers* snow-white, .3 in. across in conspicuous axillary and terminal, umbellate corymbs; pedicels slender, up to .4 in. long. *Calyx* broadly turbinate, about .1 in. long, glabrous; teeth triangular, acute; disk glands prominent as many as, and opposite to stamens. *Petals* orbicular, .15 in. long. *Carpels* free. 5.

Cultivated in the Hills often for hedging and also in gardens in plains.

Flrs. mainly 3, but continue to 5; second flush sometimes in 9-10.

## 6. NEILLIA Don.

*Neillia thyrsoflora* Don. Vern. *Torsuin*, Kh.

A branchy shrub with drooping shoots, attaining 6 ft. in height; young parts hairy. *Leaves* 1.5-3.5 by 1.2-2 in., ovate, caudate-acuminate, more or less three lobed, doubly inciso-serrate, dark-green and glabrous above with age, paler and thinly pubescent along the nerves beneath, membranous; base bordered by a pair of strong nerves, subcordate or rounded, often abruptly narrowed along the basal nerves to



the petiole; lateral nerves 4-5 on either half nervules very finely reticulated; petioles .2-.3 in. long, channelled, thinly hairy; stipules .2-.3 in. long, ovate, acute, coarsely toothed. *Flowers* usually in branched terminal or axillary pubescent racemes up to 4 in. long, the latter from upper leaf axils and sometimes simple. *Pedicels* short; bracteoles .2-.3 in. long, persistent, ovate or lanceolate, acuminate, coarsely toothed to almost entirely pubescent. *Calyx* about .25 in. long, campanulate, hairy and sometimes minutely glandular, persistent and glandular-bristly in fruit, lobes 5, about .12 in. long, induplicate, valvate in bud, ovate, caudate acuminate. *Disk* lining the calyx-tube. *Petals* 5, white, about .1 in. long, broadly obovate. *Stamens* 20-25, incurved. *Carpel* 1, free, thinly hairy; style subterminal, shortly extruded; stigma capitate; ovules 8-12 in two collateral rows. *Fruit* a coriaceous follicle almost enclosed in the calyx tube. *Seeds* small, brown, polished, marginally ridged, albuminous; testa hard, inflated.

KHASI HILLS, 5-6000 ft.

Fls. 5-6. Fr. 8-11.

## 7. ROSA Linn.

Sarmentose, climbing or erect shrubs, usually prickly. *Leaves* imparipinnate; leaflets serrate; stipules adnate to the petiole. *Flowers* terminal, solitary or in corymbs, white, red or yellow; bracts usually deciduous. *Calyx tube* persistent, globose or ovoid with contracted mouth, lobes foliaceous. *Petals* 5 (in several series in cultivated plants) large. *Stamens* numerous, inserted on the edge of the disk. *Disk* lining the calyx tube and nearly closing its mouth. *Carpels* usually many at the bottom of the calyx tube; styles subterminal, free or connate above; stigma thickened; ovule 1, pendulous. *Achenes* coriaceous or bony, enclosed in the fleshy calyx tube, forming a pseudo-baccate fruit.

Prickles scattered, recurved; leaflets large, entirely glabrous; flowers in spreading corymbs; pedicels over .7 in. long; styles connate.      ..      ..      ..      ..

1. *R. longispis.*

Prickles mostly in infrastipular pairs, straight; leaflets small, usually with pubescent midrib; flowers solitary or in congested racemes; pedicels under .4 in. long; styles free.

2. *R. involucrata*.

**1. *Rosa longicuspis* Bertol. Vern. *Shia-khari*, *Shia-soh-mei*, Kh.**

An evergreen tall and often very strong climber with a stout stem; branchlets glabrous; prickles scattered, recurved, strong. *Leaves* 3-6.5 in. long, rachis often glandular and prickly; stipules .5-.7 in. long, free portion subulate, lanceolate or ovate with glandular margin. *Leaflets* 5-7-(9), sometimes 3, 1-3 by .5-1.2 in., lower gradually smaller, ovate to oblong-lanceolate, caudate or short acuminate, serrate, subcoriaceous, glabrous; lateral nerves 7-11 on either half, very slender; petiolules very short. *Flowers* white, about 1.5 in. across, fragrant in terminal simple or compound corymbs; pedicels .7-2 in. long, pubescent and with deciduous glandular bristles; bracts up to .6 in. long, lanceolate-caudate, glandular. *Calyx tube* .25-.3 in. long, broadly obovoid, pubescent outside; lobes .5-.8 in. long, ovate or lanceolate with a caudate apex often with a few long teeth on the margins, pubescent and glandular outside, tomentose within. *Petals* .6-1 by .5-.7 in., broadly obovate or obcordate, silkily tomentose outside. *Styles* connate, exserted, column villous; stigmas expanded. *Fruit* obovoid or globose, .4-.5 in. across, brown when ripe, crowned by the calyx lobes; achenes .15 in. long.

KHASI HILLS, 5-6000 ft., usually in cool situations.

Frs. 4-5. Fr. 10.

**2. *Rosa involucrata* Roxb. Vern. *Nahor-katani*.**

A compact bush; bark almost black, thin, blaze brown; young parts and inflorescence grey or brownish tomentose. *Leaves* 2-4 in. long; rachis pubescent or ultimately glabrescent, sometimes prickly, usually with a pair of infrastipular, straight, compressed, prickles; stipules .2-.3 in. long, lacinate, adnate to the common petiole. *Leaflets* 7-9, shortly stalked, .6-1.25 by .2-.6 in., oblong to elliptic-lanceolate, broadly acute or obtuse, finely serrate with

deciduous bristly tips, coriaceous, dark-green and glabrous above, usually pubescent along the midrib beneath; lateral nerves fine, rather indistinct. *Flowers* white, 1·5-2 in. across, in short few flowered terminal corymbs or solitary; peduncles stout, much shorter than the leaves; pedicels short; bracts up to .7 in. long, lanceolate in outline, densely tomentose, irregularly cut up along the margins into setose teeth or segments. *Calyx* tube globose, .2-·3 in. across, brown or greyish velvety outside; lobes .5-·7 in. long, lanceolate or ovate-acuminate, pubescent within, deciduous in fruit. *Petals* .7-1·2 in. long, broadly obovate, retuse at the apex, glabrous. *Styles* free; stigmas discoid hairy, collected together into a cushion-like mass. *Fruit* .4-·5 in. long, globose, tomentose.

Edge of sluggish streams in SIBSAGAR, SYLHET, GARO HILLS, GOALPARA, probably in other Districts as well.

The stipules, peduncles and bracts are sometimes glandular.' The trunk is quite stout and the wood is cream coloured.

Flrs. 2-4. Fr. 5-7.

A concise synopsis of roses ordinarily cultivated in India is given in Brandis Forest Flora p. 199-201 and reproduced with few modifications by Hooker in Flora of British India Vol. II. P. 364. The climate of Assam does not seem to be so well suited for the growing of European roses as that of the other provinces of Northern India. Of the many kinds which thrive the following may be mentioned :—

1. *Rosa damascena* Mill. Vern. *Golap*. Prickles unequal, mixed with a few glandular bristles, larger ones hooked. *Flowers* scented, pink; sepals reflexed after flowering.

The commonest garden rose in the province.

2. *Rosa centifolia* Linn. Vern. *Golap*, Cabbage, Moss or Provence rose. *Prickles* unequal, mixed with numerous glandular bristles; leaflets and calyx glandular-ciliate. *Flowers* scented.

In this province it has a tendency to become very leafy with few flowers. Commonly used as stock for grafting better class roses on.

3. *Rosa microphylla* Lindl. *Branchlets* weak, prickles infrastipular; leaflets small, 9-15. *Flowers* pale pink, double. *Calyx* densely clothed with long bristly prickles.

Grown often in the hills, quite hardy.

4. *Rosa Banksiae* R. Brown. Lady Banks' rose. Scandent and almost unarmed; leaflets 3-5; flowers white or yellow in dense corymbs. Common in Shillong.

**5. *Rosa multiflora*** Thunb. Climbing, prickly. *Flowers* pink to deep red in dense massive corymbs. *Petioles*, peduncles and calyx tube pubescent.

Common in hedges and gardens in KHASI HILLS where it is a conspicuous feature during May. It also seems to be spreading in the vicinity of the town as a naturalized plant.

**6. *Rosa indica*** Linn. Syn. *R. chinensis* Jacq. Vern. Kañta golap, Beng. Glabrous, prickles equal, evergreen; stipules adnate nearly to the apex; flowers large, double to single, white rose purple or yellow on long pedicels; calyx segments reflexed. The numerous hybrid perpetuals of florists, the tea roses and the Bengal and China roses belong here. The last two groups are usually strongly scented.

Some of the roses commonly found are hybrids between this *R. damascena* and *R. centifolia*.

**7. *Rosa alba*** Linn. Vern. Shwet golap, Beng.—A spreading subsucculent shrub; prickles scattered, unequal; leaflets 5-7, large, greyish, rugose, downy and pale beneath. *Flowers* white or of a delicate blush tint, usually double; calyx segments pinnatifid.

## 8. DOCYNIA Dcne.

Trees, young parts usually woolly. *Leaves* deciduous, simple lobed in young plants; stipules deciduous, subulate. *Flowers* white, solitary or fascicled. *Calyx tube* tubular at the free end, lobes ultimately reflexed. *Petals* 5, with long woolly claws. *Stamens* 30-50, inserted at the throat of the corolla tube; anthers dorsifixed. *Ovary* adnate to the calyx tube, 5-celled; styles connate and woolly below the middle, upper portion free; ovules superposed, 3 in each cell, lowest basilar. *Fruit* a pyriform rounded or ovoid pome; endocarp tough; seeds plano-convex, testa coriaceous.

Pedicels .4-1 in. long; calyx tube elongated clavate; fruit longer than broad. . . . . 1. *D. indica*.

Pedicels .2-.4 in. long, stout; calyx tube turbinate or pyriform, short; fruit not longer than broad. . . . . 2. *D. Hookeriana*.

**1. *Docynia indica*** Dcne. Vern. Soh-phoh, Dieng-soh-phoh- soh, Saw, Kh. The Indian crab apple.

A moderate sized to tall deciduous tree, young parts and inflorescence woolly. *Bark* cinereous brown or grey usually with white blotches, warty with lenticels, nearly smooth on upper parts of stems, rough with dark patches on older parts towards the base; blaze light dun brown with white bands,

deeper layers, whitish brittle, about .25 in. thick. *Leaves* 2.4 by .9-2.2 in., ovate or oblong lanceolate, acuminate, serrate or serrulate or almost entire, coriaceous and glabrous when mature; lateral nerves 6-9 on either half, obliquely arcuate; base rounded and often entire; petiole .5-1.2 in., ultimately sparsely hairy or glabrescent; stipules .15-.2 in. long, subulate, reddish, early deciduous. *Flowers* about 1 in. across in fascicles of 2-3 or solitary; pedicels .4-1 in. long, dilated upwards. *Calyx* woolly outside; tube .25-.3 in. long, elongated, clavate; lobes narrow lanceolate, acuminate, sometimes with minute deciduous glands on the margin, woolly at the base, thinly pubescent or glabrescent upwards, .5-.6 in. long. *Petals* spreading, obovate-oblong, .5-.6 in. long, claw about .1 in. long. *Filaments* unequal, subulate, glabrous. *Pome* pyriform, 1-1.5 in. long, rugose when young, smooth with age, crowned with the remains of the calyx lobes. *Seeds* 3 in each cell.

KHASI HILLS, wild and cultivated.

The acid fruits are eaten both raw and cooked. It is sometimes used as stock for grafting apple on.

The wood is used for tool handles and the branches make good walking sticks.

Young plants are spinescent and have lobed and coarsely serrate leaves.

Flrs. 2-3. Fr. 8-9.

## 2. *Docynia Hookeriana* Dene. Vern. *Soh-phoh-heh*, *Dieng-soh-pho*, Kh.

A large tree with spreading branches; young parts and inflorescence densely covered with deciduous wool. *Bark* dark-grey or black, rough, exfoliating in roundish flakes, .5-.75 in. thick; blaze cheesy lightbrown, with vertical lines, turning dark-brown on exposure. *Leaves* 1.7-3.5 by .6-1 in., (4.5 in. long according to Hooker) narrow oblong or ovate lanceolate, long acuminate, serrate on the upper  $\frac{3}{4}$ rd, coriaceous; lateral nerves 7-10 on either half, obliquely arcuate; petiole .2-.7 in. long; stipules caducous, subulate, .15-.2 in. long. *Flowers* 1 in. across, solitary or in fascicles of 2-3; pedicels stout, .2-.4 in. long. *Calyx* tube densely woolly, 1.5-2 in. long, broad, turbinate or pyriform, constricted at the top, lobes .3-.4 in. long, often with minute

deciduous glands on the margin. *Petals* 4 in., broadly elliptic or suborbicular, abruptly narrowed to the minute claw. *Pome* contracted below the remains of the sepals, broad pyriform?

Hardly more than a variety of the last species which it closely resembles. The fruit is of different shape and much broader.

The wood is used for tomtoms and drums and the fruit is eaten.

Flrs. 2-3. Fr. 9.

### 9. ERIBOTRYA Lindl.

Small or large trees or sometimes shrubs. *Leaves* simple, serrate or entire, coriaceous; stipules lanceolate or broad. *Flowers* pentamerous, white, in dense panicles. *Calyx* tube adnate to the ovary, lobes small, erect or spreading, persistent. *Petals* 5, contorted or imbricate in bud, obovate, orbicular, usually notched and oblique, margins sinuate, claw woolly or glabrous; stamens many. *Ovary* 2-5 celled; styles 2-5, connate and woolly below; ovules 2 in each cell, basal, ascending. *Fruit* a succulent or dry berry, rarely 2-celled; endocarp membranous, usually 1, less often 2-3 seeded. *Seeds* large, angled, cotyledons very thick.

I. Indigenous species. Style 2-3.

a. A stiff shrub. Leaves linear-oblongate or lanceolate, pointing upwards. 1. *E. angustissima*.

b. Trees:—

Leaves thickly coriaceous, usually over 2 in. broad, long petioled, small to mod. sized trees. .. ..

2. *E. bengalensis*.

II. Cultivated species. Styles 5. .. .. 3. *E. japonica*.

1. *Eriobotrya angustissima* Hk. f. Vern. *Soh-thyllong*, *Dieng-sarang*, *Dieng-soh-thlong*, Kh.

A rigid evergreen shrub up to 10 ft. high, often gregarious on river banks. *Stem* brown plain; blaze light-brown, turning yellowish brown; branchlets often prominently marked with leaf scars; young parts rusty or brown woolly, soon becoming glabrous. *Leaves* often close together and appearing subopposite, usually pointing upwards, 2-4.5 by .4-.8 in., linear oblanceolate or lanceolate, subacute, bluntly short, acuminate, obtuse or rounded, distantly serrate on the upper half, stiffly coriaceous, glabrous, dark-green above;

lateral nerves 8-11 on either half, upper usually ending in serratures, base attenuated to the short petiole, dilated at the base; stipules minute, subulate. *Flowers* white, about .3 in. across in dense terminal corymbose panicles, 1.2-2.2 in. long, buds rusty or brown tomentose, ovoid or subglobose; bracts and bracteoles rusty pubescent; lowermost linear spatulate up to .6 in. long, gradually smaller upwards; bracteoles ovate to subulate, uppermost opposite at the base of the calyx, tube minute; pedicels .1-.15 in. long, stout. *Calyx* tube turbinate, about .15 in. long, pubescent or puberulous, glabrous with age; lobes very short, oblong-obtuse, densely woolly along the margins. *Petals* contorted, imbricate in bud, white, .15-.2 in. long, broadly obovate or suborbicular, usually notched at the apex, villous at the base (claw) inside. *Stamens* 20; filaments subulate, glabrous. *Styles* 3, shorter than the stamens, base and crown of ovary woolly. *Berry* pyriform, yellow when ripe, speckled, .6-.75 by .4-.5 in., 2-3 celled, not more than 2-seeded, edible.

KHASI and JAINTIA HILLS. 4500-5500 ft., Rongangiri, GARO HILLS, DC.

Old leaves yellow to red.

Fls. 3-4. Fr. 10.

**2. *Eriobotrya bengalensis* Hook. f.** Vern. *Dieng-sijnerei*, *Dieng-la-bysu*, Kh.; *Ching-nei-lei*, Naga; *Theng-okri-arong*, Mik.; *Laru-bandha?* Ass.; *Bolanchin*, Garo.

A medium sized or large tree; bark grey or dark-grey, plain or with shallow vertical furrows about 1 in. thick and warty about .15-.2 in. thick. *Blaze* yellowish with white lines, turning brown on exposure; branchlets stoutish, young parts brown tomentose. *Leaves* very variable, 4.5-10.5 by 2.2-5 in., elliptic-oblong, lanceolate or obovate, short acuminate, often abruptly, sometimes obtuse, coarsely serrate, thickly coriaceous, glabrous and shining above, glabrate or slightly puberulous along the nerves beneath when mature; lateral nerves 8-15 on either half, forked near the margin, branches usually ending in serratures; base abruptly cuneate or gradually attenuate; petiole .8-2 in., dilated at the base; stipules linear-oblong, acute or acuminate with persistent broad bases, up to .8 in. long. *Flowers* white, fragrant,

·3 in. across. *Panicles* terminal, 3-5 in. long, pubescent, ultimately glabrous. *Bracts* caducous; pedicels tomentose, ·15 in. long, glabrous in fruit. *Calyx tube* ·15·2 in. across, densely pubescent, obconic, lobes ovate acute or obtuse, woolly on the margins. Petals broad ovate or orbicular, contorted in bud, claw woolly, about ·15 in. long. *Stamens* about 20; filaments subulate. *Styles* usually 3, sometimes 2, base of the style and crown of ovary woolly. *Berry* 1-celled, glabrous, ·75 in. long.

KHASI and JAINTIA HILLS, up to about 4500 ft., CACHAR, SIBSAGAR, LAKHIMPUR? (sheet No. 6865), GARO HILLS.

Wood light reddish-brown, even grained, medullary rays of two kinds—several very fine between comparatively broader rays, takes a good polish.

Flrs. 9-10. Fr. 3-4.

**Var. *parvifolia*.**—Leaves comparatively narrower, 3-7 by ·5-2 in., narrow lanceolate to oblong-lanceolate, sometimes oblanceolate, acuminate or caudate-acuminate, thinly coriaceous; base gradually attenuate; petiole ·5·9 in. long, lower bracts 3-lobed, up to ·3 in. long; styles woolly nearly to the top. *Berry* not seen.

SIBSAGAR-Mikir Hills, N. CACHAR HILLS, GARO HILLS Sanitarium Hill (sheet No. 5238). A remarkable form growing to a much larger size and with rather different leaves than the type.

### 3. *Eriobotrya japonica* Lindl. Vern. *loquat* Hin.

A moderate sized tree with stout branches; young shoots, leaves beneath and inflorescence densely covered with tawny or brown wool. *Leaves* 6-11 by 1·5-3·2 in., oblanceolate, acuminate or acute, subentire or distantly serrate, glabrous above, toughly coriaceous; lateral nerves 12-16 on either half ending in serratures; base narrowed into a very short, stout, woolly petiole. *Panicle* shorter than the leaves, branches stout. *Flowers* ·4·5 in. across, crowded; bracts and bracteoles ovate. *Calyx* densely woolly outside, tube short, lobes ovate, obtuse or subacute. *Petals* ·3 in. long, broad ovate or orbicular, with a woolly claw. *Styles* 5. *Berry* 1-1·5 in., pyriform, intruded at the top, yellow or orange when ripe, 1-5 seeded.

Cultivated up to 5000 ft.; does fairly well in most districts.



## 10. PYRUS Linn.

Trees or shrubs with deciduous usually simple, less often pinnate leaves; stipules deciduous. *Flowers* white, red or pink, in terminal cymes or corymbs, bracteate. *Calyx tube* urceolate, turbinate or obconic; lobes 5, erect or reflexed, persistent or deciduous. *Petals* 5, imbricate in bud. *Stamens* 20 or more. *Disk* annular or lining the calyx tube. *Carpels* 2-5, connate, adnate to the calyx tube; styles 2-5, free or connate below; ovules 2 in each cell. *Fruits* 2-5 celled pome, cells lined with a cartilaginous or coriaceous, often 2-valved endocarp. each with 1-2 seeds.

## I. Styles 3-5 :—

## A. Mature leaves glabrous or glabrescent beneath :—

Calyx lobes deciduous in fruit :—

Styles united towards the base,

fruit red when ripe, .3 in. across. 1. *P. baccata*.

Styles free; fruit brown, spotted,

.5-1.5 in. across. . . . . 2. *P. Pashia*.

## B. Mature leaves woolly-tomentose beneath; calyx lobes persistent in fruit;

fruit .5-.75 in. across. . . . . 3. *P. vestita*.

## II. Styles 2-3 :—

Calyx lobes deciduous; fruit umbonate :—

Fruit obtusely 3-4 angled, warted. . . 4. *P. khasiana*.

Fruit not angled nor warted :—

Umbo less than third of the

diameter of the fruit; fruiting

corymb densely warted. . . . . 5. *P. cuspidata*.

Umbo about half the diameter of

the fruit; fruiting corymb with

small lenticels. . . . . 6. *P. polycarpa*.

1. *Pyrus baccata* Linn. Vern. *Soh-shur-um*, Kh.

A small tree branched from near the ground; bark dark-brown, almost black, splitting in rectangular flakes, pale dun-brown, turning deeper yellow to brown on exposure; branchlets hairy, soon becoming glabrous. *Leaves* 1.5-3 in. by .8-1.5 in., elliptic, lanceolate or oblong-lanceolate, sometimes suborbicular, acute or acuminate, serrate, thinly coriaceous, glabrous or pubescent beneath on the main nerves; lateral nerves 5-7, distant, arcuate; petiole .5-1.5 in. long, slender or glabrescent with age. *Flowers*

white, 1-1.5 in. across in umbels or fascicles at the ends of short branches; pedicels slender, 1-2 in. long, glabrous or with few hairs. *Calyx tube* urceolate, .2 in long, glabrous or tomentose; lobes deciduous, about as long as or slightly exceeding the tube, lanceolate acuminate, tomentose within. *Petals* variable in length and breadth. *Styles* 3-5, united and woolly towards the base. *Fruit* about .3 in. across (in the form found in our area), scarlet when ripe, globose, depressed at the apex, endocarp crustaceous.

KHASI and JAINTIA HILLS.

Flrs. 3-4. Fr. 9-10.

## 2. *Pyrus Pashia* Ham. Vern. *Soh-shur*, *Soh-jhur*, Kh.

A medium sized deciduous tree, bark rough, dark-grey to almost black, furrowed on old stems, nearly smooth and dark-brown on branches; blaze light red, turning light yellowish-brown; young parts and inflorescence covered with dense white wool. *Leaves* 1.8-4 by .9-1.5 in., ovate-elliptic, lanceolate or lanceolate-acuminate or sometimes caudate, finely serrate to crenate, specially when young, glabrous or glabrescent beneath when mature, subcoriaceous; lateral nerves 7-10 on either half, more prominent above; petioles .8-2 in. long, slender; stipules caducous, .4-.5 in. long, setaceous. *Flowers* white, .8-1 in. across in short corymbs, umbels or fascicles at the ends of short lateral branches. *Pedicels* .5-2 in. long, woolly when young; bracts resembling the stipules. *Calyx tube* about .15 in. long, woolly or glabrate, urceolate, deciduous, .1-.15 in. long, ovate acute, woolly within; disk nearly closing the mouth of the calyx tube. *Petals* obovate or suborbicular, .3-.4 in. long. *Stamens* 25-30. *Carpels* 3-5. *Styles* free, more or less woolly at the base. *Fruit* .5-1.5 in. across, globose, depressed at the top, somewhat rough with raised white specks, dark-brown when ripe, endocarp crustaceous.

KHASI & JAINTIA HILLS, 5000-6500 ft.

The fruit is eaten when nearly half-rotten.

Flowers with new leaves 3-4. Fr. ripen 12-1. Old leaves dry black.

The young plant is armed strong, often leaf-bearing spines and has 3-5 lobed leaves. It is very suitable stock for grafting pears on.

**P. sinensis** Lindl. Vern. *Naspati rit*, Kh.; *Naspati*, Beng., Ass., Nep. The Chinese or sand pear.

A medium sized deciduous tree with rough grey bark. *Leaves* 2.5-6 by 1.5-3.5 in., broadly ovate to elliptic lanceolate or elliptic, acuminate, finely serrate, glabrous, glossy and dark-green above; lateral nerves ascending, 7-10 on either half, more prominent above; petiole 1-2 in. long, slender, channelled above; stipules linear, short. *Flowers* white, about 1.25 in. across, corymbose on short lateral shoots; pedicels 1-1.5 in. long, much thickened and lenticellate in fruit. *Calyx* tube urceolate, glabrous or puberulous; lobes deciduous. *Petals* suborbicular; styles free not woolly. *Fruit* 3-5 in. across, globose to pyriform, depressed at the apex, rough with close raised specks, yellowish green, sometimes partly scurfy when ripe; pulp very gritty.

Largely cultivated and bears often profusely in the hills. Sometimes naturalized in the KHASI HILLS. The serratures are tipped with minute deciduous bristles.

Flrs. 3-4. Fr. 7-9.

**P. communis** Linn. Vern. *Naspati*. The pear.

Very similar and probably not specifically distinct. A deciduous tree sometimes with spinescent branches. *Fruit* usually pyriform, smoother and more yellowish outside, pulp not gritty.

Cultivated with some success at Shillong but the fruit does not attain the same quality as it does in other hill stations.

**P. Malus** Linn. The apple. Vern. *Seb*, Hin.; *Aple* Beng., Ass.

A small deciduous tree; branchlets tomentose. *Leaves* 2-3 in. long, ovate, acuminate, serrate or crenate, more or less tomentose beneath. *Flower* pale pink. *Fruit* globose, depressed at each end, and crowned with the persistent calyx lobes.

Cultivated at Shillong, with some success, but the fruit is much inferior to those produced in the hills of N. W. India.

### 3. *Pyrus vestita* Wall. Var. *hasiana* Hk. f.

A tree with densely ferruginous or greyish woolly young parts. *Leaves* 3.5-4.5 by .8-1.2 in., lanceolate or oblanceolate, acuminate, somewhat distantly dentate-serrate, entire towards the base, glabrescent above, densely felted beneath; lateral nerves 10-12; base cuneate; petiole .3-.6 in. long, channelled; stipules linear, about .4 in. long. *Flowers* about .3 in. across, in terminal and subterminal woolly corymbose panicles, broader than long. *Calyx* woolly, turbinate, lobes short, persistent. *Petals* woolly within; styles 3-5, hairy only at the base. *Fruit* globose or pyriform, about .7 in. across.

KHASI HILLS, 5000 ft.—*Mann*. There are no specimens at Sibpur.

The type has larger leaves which are 4-8 in. by 2-5-5 in., ovate-elliptic, oblong or lanceolate. Of this there is no record from our area.

Flrs. 5-6. Fr. 10-11.

#### 4. *Pyrus khasiana* Dene.

A small tree (according to Hooker a tolerably large tree); young parts and inflorescence cottony floccose; branchlets glabrous, speckled with lenticels. *Leaves* 2-7-6 by 1-2-3 in., lanceolate to elliptic ovate, often abruptly sharp-acuminate, acute or cuneate at the base, sharply serrate, coriaceous, glabrous with age; lateral nerves prominent beneath, 8-12 on either half, subparallel, nearly straight, tertiaries fine; petiole .5-1 in. long, dilated towards the base. *Corymbs* branched, the lower arising in upper leaf axil. *Flowers* white, .3-.4 in. across when fully opened; pedicels stout, .1-.15 in. long, much enlarging and glabrous in fruit. *Calyx tube* .2 in. long, at first cottony tomentose, .2 in. long; calyx lobes deciduous, broadly triangular; petals about .15 in. long, suborbicular-obovate. *Styles* 3-4, glabrous. *Fruit* about .3-.4 in. across, globose, obtusely 3-4 angled, somewhat rough and dotted with raised specks outside, crowned by a depressed umbo with a conical centre, 3-4 celled, pulp granular, endocarp crustaceous, cells 1 seeded.

KHASI & JAINTIA HILLS, Laitkor, Nungbru Wood-Griffith, Myrung, 4500-6000 ft., MANIKUR;—not common.

Fr. 7-8.

#### *Pyrus granulosa* Bertol. Vern. *Dieng-soh-iong-throng*, Kh.

A moderate sized deciduous tree with thin pale, grey and rather rough bark; young parts and inflorescence flocculent cottony. *Leaves* 3-5-5-5 by 1-5-2-5 in., ovate-lanceolate to ovate-elliptic, acuminate; base acute, rounded or cuneate, sharply serrate, nearly entire towards the base, glabrous with age; lateral nerves 8-10, slightly curved; petiole .6-1 in. long, ultimately glabrous. *Flowers* white, about .25 in. across in terminal, compound corymbs, the lower branches sometimes from upper leaf axils. *Calyx* at first cottony tomentose, ultimately glabrous; pedicels much enlarged in fruit. *Fruit* .5-.7 in. across, globose or subpyriform, warty, turning purplish black in ripening. Kurz,—3-4 celled, obtusely angled when dry, with a depressed umbo with a short blunt cone in the centre, flesh granular.

KHASI HILLS 5-6500 ft.—not common, sometimes epiphytic.

Hardly more than a variety of *P. khasiana*. The leaves have usually fewer nerves, and the fruits are larger, and not angled. The shape and venation of the leaf on which separation of the two species is based in F. B. I. are not constant characters.

Fr. 5-7.

### 5. *Pyrus cuspidata* Bertol.

A medium sized deciduous tree. *Bark* dark-brown or pale-grey, rough, hard, fibrous and pale to reddish-brown inside; branchlets stout with prominent oblong-lenticels, which coalesce in old branches and often form raised transverse lines; young parts and inflorescence clothed with flocculent wool. *Leaves* 3-5 by 1-2 in., ovate to oblong-lanceolate or elliptic ovate, somewhat coarsely cuspidate-serrate; base rounded to suddenly cuneate, subcoriaceous, glabrous when mature; lateral nerves 10-12 on either side, slightly bent, tertiaries subparallel, close; petiole .8-1.5 in. long; stipules caducous, about .2 in. long, subulate. *Flowers* .25 in. across, white in terminal pyramidal panicles of corymbs, 1.5-3 in. long, densely warted with raised lenticels in fruit; pedicels slender. *Calyx* tube .1 in. long, turbinate at first, woolly glabrescent with age; lobes deciduous, about as long as the tube, triangular, acuminate, often with somewhat blunt tip, glabrous within except for the woolly tip. *Petals* about .1-.12 in. long, obovate to suborbicular, caducous, woolly inside, with a short puberulous claw. *Style* 2-3, united at the base, glabrous; stigmas with a central groove. *Fruit* .2-.3 in. across, globose or subpyriform, glabrous, not dotted, 2- less often 3-celled, apex with a depression and conical umbo.

KHASI & JAINTIA HILLS 4000 ft.

Wood reddish-brown, hard, seasons and polishes well; pores uniform, medullary rays fine.

Fls. 3-4. Second flush (?) 10-11. Fr. 11-12.

### 6. *Pyrus polycarpa* Hk. f. Vern. *Dieng-loporam*, Synt.

A small tree; young parts clothed with flocculent tomentum. *Bark* rough grey; blaze fibrous, light-red, turning brown; branchlets with elongated lenticels. *Leaves* 2.5-5 by 1-2.5 in., lanceolate to ovate lanceolate, acuminate or caudate, closely and often unequally serrate; base cuneate,

often thin, slightly unequal, connate-often abruptly, entirely glabrous when mature, thinly coriaceous; lateral nerves 8-12 on either half; petioles .6-1.3 in. long, slender, finely channelled. *Flowers* not seen, but according to Hooker .3 in. across in glabrous and smooth corymbs; pedicels slender. *Calyx tube* rather pyriform, limb expanded, lobes deciduous in fruit. *Petals* obovate, sessile, glabrous; styles 2, united to above middle, glabrous. *Fruiting* corymb branched, more or less bearing at the ends of the branches, dotted with small raised lenticels, which are not so prominent as in *P. cuspidata*. *Fruit* .15-.25 in. with a large depressed umbo about half the diameter of the fruit with a bluntly conical centre.

KHASI HILLS 4500-6500 ft.

Flrs. 3-4. Fr. 11-2?

#### 11. STRANVÆSIA Lindl.

**Stranvæsia glaucescens** Lindl. Vern. *Dieng-sia-saw*, *Dieng-soh-sao-chi*, Kh.

A small or medium sized tree with a spreading crown attaining 80 ft. in height and 8 ft. in girth. *Bark* brown to dark-grey or almost black and rather rough, exfoliating in irregular pieces; blaze pinkish, turning reddish-brown, arrested shoots sometimes ending in spines; young parts and inflorescence clothed with deciduous tomentum. *Leaves* 2.4-5 by .7-1.7 in., obovate-lanceolate or oblong-ob lanceolate, acuminate, acute or obtuse and apiculate serrulate or finely serrate, sometimes entire, coriaceous, dark-green and shining above undersurface paler, pubescent beneath when young, glabrous with age, coriaceous; lateral nerves 10-14, very slender; base narrowed to the petiole, which is .4-.75 in. long, glabrous or sometimes puberulous; stipules deciduous, subulate, up to .2 in. long. *Flowers* white, about .5 in. across, many in terminal spreading compound corymbs, 2-4 in. across; primary branches floriferous at the ends, lower axillary; pedicels up to .3 in. long. *Calyx tube* obconic, woolly; limb spreading, 5 lobed; lobes erect, acute, persistent in fruit. *Petals* 5, overlapping in bud, spreading, broadly obovate, clawed, claw glabrous. *Stamens* about 20. *Ovary*

5-celled, crown short, villous; styles 5, connate to more than half way up, column villous at the base; stigma capitate; ovules 2 in each cell, collateral, basal. *Fruit* about .3 in. across, globose, rather fleshy, orange yellow and glabrous or sparsely hairy when ripe, with a 5-celled, crustaceous, loculicidally dehiscent endocarp, the crown of which is exserted; cells 1-seeded.

KHASI HILLS 4000-5000 ft.—3000-4000 ft., (locality not mentioned) according to a sheet of Mann's.

Timber pinkish when freshly cut, turning afterwards to reddish-brown, pores numerous, small, med. rays fine, uniform, seasons and polishes well.

Flrs. 5-6. Fr. 10-1.

## 12. PHOTINIA Lindl.

Evergreen trees or shrubs. *Leaves* simple, coriaceous, entire or serrulate; stipules subulate. *Flowers* small in spreading corymbose terminal panicles, white; bracts deciduous. *Hypanthium* obconic, enlarging in fruit; sepals 5, short, persistent. *Petals* 5, obovate or suborbicular, spreading. *Stamens* 20 or more. *Ovary*  $\frac{1}{2}$  inferior, free portion hirsute, usually 2, rarely 3-celled; styles 2, rarely 3, free or combined at the base; stigmas broad; ovules 2 in each cell, collateral, ascending. *Fruit* a small, globose or ovoid, drupe with 1-2 pyrenes each in a membranous or crustaceous endocarp. *Seeds* 1-2 in each pyrene, obovoid, triquetrous or compressed, testa coriaceous.

Leaves 4.5-9 in. long. . . . . 1. *P. Notoniana*.

Leaves 1.5-4.25 in. long; petioles under .7 in. . . . . 2. *P. integrifolia*.

**1. Photinia Notoniana** W & A. Vern. *Dieng-khau-soh-riu*, *Dieng-soh-lar-maw*, *dieng-biai*, Kh.; *dieng-soh-laklong*, *Dieng-sa-halim-blai*, Synt.

A handsome moderate sized to large tree according to locality, all parts glabrous except the inflorescence. *Bark* greenish-grey or brown, somewhat rough, exfoliating in thin scales, irregularly warty, thin, blaze yellowish or light brown with white lines, turning darker on exposure. *Leaves* variable, 4.5-9 by 1.5-3 in., elliptic, lanceolate or oblanceolate to

oblong, entire, obliquely acuminate, sometimes caudate, margins irregularly undulate, coriaceous, dark glossy green above, paler beneath, turning coppery to bright red before falling, midrib stout; main lateral nerves fine, about 10-15 pairs mixed with many minor ones; base sub-acute or rounded, often unequal; petiole .6-1.5 in., stout, more or less channelled; stipules minute, subulate, long persistent. *Flowers* white, .25-.35 in. across in spreading terminal corymbose panicles, up to 8 in. across, broader than long, panicle branches glabrate to hoary pubescent; bracts about .1 in. long, caducous, reddish-brown, tricuspidate with a central subulate awn much exceeding the others, woolly at the apex, broadened and concave at the base. *Calyx* .1 in. long, (including the hypanthium) whitish, glabrous; segments minute, triangular, acute. *Petals* .1 in. long, imbricate in bud, broadly obovate or suborbicular with a very minute claw, glabrous, ultimately reflexed. *Stamens* subulate; free portion of the ovary villous; styles 2, glabrous. *Drupe* .2 in. across, globose or ovoid, yellow when ripe, crowned by the calyx teeth, somewhat rough, endocarp soft, rarely both seeds in each pyrene developing.

KHASI & JAINTIA HILLS, 4-6000 ft.

Wood reddish-brown, hard, close grained, with fine medullary rays, capable of taking fine polish but liable to crack, weight 57 lbs. per c. ft. (Gamble).

Sometimes an epiphyte in early life. Young leaves deep pink along the nerves.

Flrs. 2-3. Fr. 6-7.

**Var. *eugenifolia*, *P. eugenifolia* Lindl. *P. micrantha* Dcne.**—Panicle branches hoary pubescent.

**Var. *macrophylla***—leaves caudate-acuminate, panicle glabrous or nearly so.

**2. *Photinia integrifolia* Lindl.** Vern. *Soh-lar-maw*, *Dieng-soh-lar-maw*, *Dieng-ngiang-risiong*, *Dieng-lar-maw*, Kh.

A small or moderate sized branchy tree attaining about 50 ft. in height, all parts glabrous. *Bark* dark-brown or grey rough, thin; blaze yellowish, turning brown. *Leaves* 1.5-4.25 by .7-1.2 in., oblanceolate or obovate, shortly blunt acuminate, quite entire, margins slightly recurved, thinly



coriaceous, glabrous, secondary nerves fine, about 6-9 on each half, mixed with intermediate minor nerves; base narrowed, sometimes cuneate, tapering to the petiole; petiole .4-.7 in. long; channelled, swollen at the base; stipules minute, subulate with a broad base. *Flowers* white, .15 in. across, in spreading corymba. *Sepals* minute, lobes triangular, persistent; styles glabrous. *Drupe* globose, .15 in. across, blackish-brown when ripe.

KHASI & JAINTIA HILLS above 3000 ft.

As in the last species the old leaves turn coppery and then bright red before falling.

Fls. 3? Fr. 2.

Fruit like galls are sometimes formed from the young ovary by insects which are larger than ordinary fruits.

### 13. POURTHIÆA Dene.

**Pourthiæa arguta** Dene. Vern. *Dieng-snam-dieng-um*, *Dieng-soh-dikhiew*, *Dieng-tyrkhim*, Kh.; *Dieng-soh-ryng-kham-um*, *Dieng-soh-pho-blai*. Synt.

A very variable erect shrub or small tree; bark grey to almost black, somewhat rough; blaze yellowish light-red or light-brown, turning yellowish brown. twigs often closely lenticellate; young parts and inflorescence at first woolly, glabrescent with age. *Leaves* 1.5-5.5 by .6-1.8 in., simple, lanceolate, oblong to elliptic-lanceolate, acuminate or sometimes acute, finely serrate or serrulate; lateral nerves 7-10, in some forms up to 12, on either half, impressed above, curved; base cuneate or acute; petiole .15-.4 in. long, glabrous or ultimately glabrescent; stipules minute, subulate. *Inflorescence* terminal, very rarely axillary, lenticellate. *Flowers* white, .25-.3 in. across, in few flowered dense corymba or few together on the dense or lax corymbosely arranged branches of the inflorescence, the latter up to 1 in. long; pedicels up to .3 in. long; bracts and bracteoles setaceous. *Calyx tube* broadly obconic, densely or thinly woolly outside, lobes 5, triangular acute, as long as the tube, persistent in fruit, glabrous inside, except at the tips. *Petals* 5, contorted in bud, clawed, obovate or suborbicular, entire or notched, hairy or woolly within about the claw;

stamens about 20; filaments slender. *Ovary* 3 or 2 celled, nearly free and adnate to the calyx tube at the base, often only on one side, villous at the apex; ovules 2 in each cell, collateral, basal. *Styles* 3 or 2, connate half way or more up; stigma capitate, 2-fid. *Fruiting* corymb glabrous or glabrate, warty with lenticels. *Fruit* .25-.3 in. across, globose or obovoid-globose, 1-2 seeded with granular pulp; endocarp membranous. *Seeds* usually 1-2, plano-convex; testa coriaceous, closely marked on the convex side.

KHASI HILLS 2500-6500 ft.

According to Hooker the claw of the petals is glabrous, but in the large number of specimens examined by me I have found them always more or less hairy.

The timber is reddish-brown, seasons well and takes a fine polish; medullary rays fine, pores larger than in *Pyrus*. It should prove suitable for cabinet work if it could be obtained in sufficiently large size.

Flrs. 4. Fr. 12-1.

The following forms may be separated:—

1. **Var. Wallichii** F. B. I. Syn. P. *arguta* Dcne.—*Leaves* 1.5-5 by .6-1.3 in., quite glabrous with age, coriaceous; pedicels stout, rugose with raised lenticels; fruit .25 in. across.

Commonest form, 3000-5500 ft.

2. **Var. Hookeri** F. B. I. Syn. P. *Hookeri* Dcne.—*Leaves* 3.5-5 in. long, oblong-lanceolate, acuminate, sometimes caudate; petiole long, up to .4 in.; corymbs lax; pedicels more slender than in var. *Wallichii*. *Fruit* .3 in. across, globose.

Mynso—2500 ft., Umpani 3500 ft. (KHASI HILLS.)

3. **Var. latifolia**. *Leaves* 2.7-5 by 1.2 in., elliptic to oblong lanceolate, acuminate or caudate, midrib more or less persistently woolly; lateral nerves up to 12; petiole short. *Corymb* branches spreading, subumbellately collected on the axis, soon glabrescent. *Calyx* thinly woolly at the time flowers open, glabrate later on. *Fruit* ovoid-globose, up to .35 by .3 in.

KHASI HILLS 5000-6000 ft., e.g. Chang-chong forest, etc.

4. **Var. membranacea** Hk. f. *Leaves* oblong to ovate lanceolate, sharply acuminate, sharply serrate. *Inflorescence* very woolly. *Corymb* branches lax.

Surarim, etc. (KHASI HILLS.)

5. *Var. Parvifolia*.—*Leaves* 1.5-2.5 in. long, narrow lanceolate, coriaceous, acuminate. *Corymbs* contracted, fruit  $\frac{1}{4}$  in., rather ovoid.

KHASI HILLS—Jowai—C. B. Clarke.

*Pourthiza salicifolia* Dcne. *P. arguta* Dcne. *Var. salicifolia* Hk. f. Vern. *Dieng-soh-dikhiu*, Kh.

A large shrub; young shoots, petiole, midrib of leaves and inflorescence subpersistently flocculent, tomentose. *Leaves* 2.5 by .6-1 in., narrow-lanceolate, oblanceolate or oblong lanceolate, finely acuminate, finely cuspidate serrate; base attenuate-cuneate, subcoriaceous, glabrous or glabrate with age above, more or less floccose beneath, specially along the midrib; lateral nerves 10 on either side, arcuate, prominent beneath, nervules much more laxly reticulate between than in the last species; petiole .15-3 in. long. *Flowers* creamy white, .25-.3 in. across, either few together (often 3) at the ends of the lax branches of a corymb or on simple corymbs; flower buds almost hidden in cotton. *Calyx* hoary with matted hairs, lobes woolly within at the apex only. *Petals* suborbicular, woolly inside about the claw; styles and ovary as *P. arguta*. *Fruit* obovoid, globose, about .2-.25 in. long on lenticellate pedicels.

Rongengiri—CARO HILLS.

This form is so markedly different that it seems best to separate it.

#### 14. COTONEASTER Linn.

*Cotoneaster Simonsii* Baker. Vern. *Dieng-jik-rai*, Kh.

A rigid shrub attaining 8 ft. in height; young parts densely pubescent or villous. *Leaves* subdistichous, .5-.9 in. long, rhombic-orbicular to ovate, abruptly short acute or acuminate, mucronate, entire, margins subrecurved, subcoriaceous, at first thinly pubescent with long adpressed hairs on both surfaces, sparsely pubescent or glabrous with age except along the midrib; lateral nerves 4-5, very slender, arched; petiole .1-.15 in. long, adpressed pubescent; stipules subulate from a broad base up to .25 in. long. *Flowers* not seen. *Fruit* subsessile or shortly pedicellate, solitary or in pairs on the leaf axils, bright scarlet and glabrous when ripe, oblong turbinate, crowned with the incurved calyx lobes with 2-3, bony, 1-seeded stones.

Laitlyngkot—KHASI HILLS.

Fr. 11.

## FAM. 52. SAXIFRAGACEÆ.

Trees, shrubs or herba. *Leaves* alternate; stipules 0, or the stipules adnate to the base of the petiole or opposite and exstipulate. *Flowers* hermaphrodite or polygamodiceous, regular, usually 5, sometimes 4 merous. *Calyx* more or less adnate to the ovary, sometimes quite free; lobes imbricate or valvate. *Petals* rarely 0, perigynous or epigynous, rarely subhypogynous, imbricate or valvate. *Stamens* inserted with the petals, equalling or double the number, rarely numerous. *Disk* cup-like or sometimes reduced to intrastaminal glands. *Ovary* of 2 or 3-5 carpels, usually 2 or 3-celled with axile placentas, sometimes 1-celled with parietal placentas; styles as many as the carpels, free or combined nearly to the top; stigmas capitate or lateral and subcapitate; ovules numerous, erect or pendulous. *Fruit* capsular or baccate. *Seeds* numerous or few, rarely solitary, usually albuminous.

Shrubs or trees :—

A. Leaves opposite or subopposite :—

1. Stamens 8-12. Seeds many :—

a. Styles 2-4 :—

Calyx segments of sterile flowers much enlarged in fruit; fruit capsular, dry. . . . .	1. <b>Hydrangea.</b>
All flowers fertile; fruit baccate, intensely blue. . . . .	2. <b>Dichroa.</b>

b. Style 1; petals falling off in a cap. . . . .	3. <b>Pileostegia.</b>
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2. Stamens 4, seeds 1. . . . .	4. <b>Polyosma.</b>
3. Stamens 20-40. . . . .	<b>Philadelphus</b>

B. Leaves alternate :—

Ovary nearly free of 2 carpels,  
almost wholly superior :—

Fruit a capsule. No basal nerve. 5. **Itea.**

Ovary inferior :—

Fruit a berry; leaf base 3-5 nerved. . . . .	6. <b>Ribes.</b>
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Herbs with perennial rootstocks :—

Ovary of two carpels :—

Leaves simple.	..	..	<b>Saxifraga.</b>
Leaves pinnate.	..	..	<b>Astilbe.</b>

### 1. HYDRANGEA Linn.

**Hydrangea vestita** Wall. Vern. *Siw-pakha* or *Pakha-khalaw*, *Dieng-lap-masi* (bullock's kidney), *Dieng-jariet-iong*, Kh.

A small crooked deciduous tree or a large shrub. *Bark* greyish, exfoliating in thin flakes, soft and corky; blaze greenish-white, smooth; young parts and inflorescence rather rough with papillose hairs with persistent bases, the latter ultimately forming raised dots; branchlets stout with a large pith. *Leaves* 4·5-9 by 2·5-5 in., broadly ovate or elliptic to suborbicular, acute or obtuse, unequally dentate, subcoriaceous, thinly hairy or glabrescent above, tersellated and thinly clothed with white papillose hairs beneath; petiole ·8-2 in. long, channelled with subamplexicaul bases. *Flowers* greenish-white, about ·2 in. across, outer sterile, in many flowered-flat-topped terminal, corymbose panicles, lower branches from upper leaf axils; lower bracts leafy, upper gradually smaller, ultimately spatulate, subulate or setaceous; bracteoles resembling the upper bracts; pedicels about ·05 in. long, hairy. *Calyx* adnate to the ovary, glabrous; lobes 5, about equalling the tube or slightly longer, ovate—acute, those of the sterile flowers sub-petaloid, greenish, ovate—elliptic, elliptic or orbicular, entire, veinose, thin, usually 3-4 developing, ·4-·8 in. long. *Petals* valvate, expanding, (not falling off in a piece), about ·1 in. long, exceeding the calyx lobes, oblong. *Stamens* 10. *Ovary* somewhat imperfectly 3 celled; ovules many, axile at the ends of the partitions; styles 3, persistent. *Capsule* crowned by a conical cap formed by the styles and opening by an aperture at their base; seeds minute; testa hyaline, tailed at either end.

KHASI HILLS 5-6000 ft., on shady banks of streams.

**Hydrangea robusta** Hk. f. & T. Var. *Griffithii* C. B. Clarke?

A large shrub or a small tree; young parts pubescent. *Leaves* 4·5-9 by 3·5 in., ovate or elliptic, acuminate, serrate-dentate; base rounded or in upper leaves narrowed to the petiole; lateral nerves about 8 on either half, arcuate, with few scattered hairs above thinly

hirsute on the nerves beneath, (undersurface not tersellated); petiole 1·2-2 in., channelled, upper margined. *Flowers* blue; panicles spreading, corymbose. *Sepals* of sterile flowers 1·1-5 in., elliptic or elliptic obovate, narrowed to a very short stalk at the base, serrate or coarsely few toothed. *Calyx* teeth of fertile flowers, minute. *Styles* 2. *Capsule* subhemispheric, broader than long, slightly compressed, ribbed.

Mishmi Hills near Dilai.

Fr. 10.

**Hydrangea hortensis** Sieb.—A large very spreading shrub. *Leaves* about elliptic-acuminate, serrate, dark green, glabrous, except along nerve axils. *Flowers* in large compact head-like compound cymes, all sterile, blue, turning pink.

Largely grown in Shillong in gardens.

## 2. DICHROA Lour.

**Dichroa febrifuga** Lour. Vern. *Kaliangeri*, *Ban-suk*, Nep.

An erect shrub 5-8 ft. in height; stems grey with large pith; young shoots and inflorescence pubescent with short curled hairs. *Leaves* opposite, 3·5-8 in. by 1·2-3 in., lanceolate or oblanceolate, acuminate, dentate, tapering at the base to the petiole, chartaceous, thinly pubescent along the nerves on both surfaces and with few scattered hairs above between the nerves; lateral nerves 7-9 on either half, arcuate; petiole usually ·5-1·5 in., sometimes up to 2 in. long, channelled, dilated at the base. *Flowers* blue, ·3 in. across in terminal panicles of cymes; pedicels slender, ·2-4 in. long. *Calyx* tube adnate to the ovary, thinly hairy; limb 5-6 toothed. *Petals* valvate, 5-6, expanding, oblong, thick, about ·3 in. long. *Stamens* 10 or 12, epigynous; anthers clavate, blue. *Ovary*  $\frac{1}{2}$  inferior, 1-celled; styles 3-5; stigmas blue, resembling the anthers; ovules numerous on 3-5 parietal placentas. *Berry* ·2 in. across, globose, deep blue when ripe, crowned by the persistent calyx lobes, 3-5 styles in the centre; seeds numerous, small; testa with large reticulations.

KHASI HILLS 4500-6000 ft.

The Nepalese use as a decoction from the shoots and bark of the roots as a febrifuge often in sufficient quantities to make them sick which not improbably aids indirectly in curing. It appears to have no active effect in ordinary doses.

Fls. 7-8. Fr. 11-12.

## 3. PILEOSTEGIA Hk. f. &amp; T.

*Pileostegia viburnoides* Hk. f. & T.

An evergreen shrub or small tree attaining about 25 ft. in height, with rather stout decussate branches. *Leaves* decussate, 3-6 by 1-2 in., obovate or elliptic, oblong, acute or acuminate, gradually narrowed to the base, entire or sometimes serrulate, coriaceous, glabrous; lateral nerves 6-8 on either side, oblique, arched; petiole .3-.5 in. long, channelled and flattened. *Cymes* in terminal panicles, which are 5-6 by 4-5 in. with decussate branches. *Flowers* .2 in. across; calyx teeth very broadly triangular; petals imbricate, white, obovate, connate at the base and falling off as a cap; stamens 5, 8 or 10; filaments .2-.35 in. long. *Ovary* inferior, 4-6 celled with numerous ovules; style thick with a pyramid at the apex, the 4-6 angles of which are stigmatic; ovules numerous, pendulous. *Fruit* ovoid, .3 in. long, capsular.

## 4. POLYOSMA Blume.

*Polyosma integrifolia* Blume.

A middle sized evergreen tree; young shoots tawny pubescent; twigs lenticellate; branchlets lenticellate. *Leaves* nearly opposite, 3-8 in. long, lanceolate or oblanceolate, acuminate, entire or distantly toothed, cuneate at the base, more or less pubescent on the nerves, more persistently beneath; petiole .5-1 in. long, pubescent. *Flowers* greenish-white, tetramerous in terminal pubescent racemes; pedicels very short; bracteoles 3, small, subulate; buds densely pubescent, cylindrical, .3-.5 in. long. *Calyx tube* adnate to the ovary; lobes small, persistent, deltoid. *Petals* valvate, linear, often cohering, hairy within. *Stamens* 4, epigynous; filaments thick, hairy. *Ovary* inferior, 1-celled; ovules numerous on two parietal placentæ, which intrude considerably in the cells. *Fruit* sub-baccate, .3-.5 in. long, smooth, ellipsoid, 1-seeded. *Seed* ascending with fleshy albumen and small embryo.

KHASI HILLS 3,000-4,000 ft. *De Silva, Hooker, ASSAM*—Griffith.

Flrs. 5, rainy season (Brandis).

*Var. typica* C. B. Clarke.—Leaves entire.

*Var. Wallichii* C. B. Clarke.—Leaves denticulate.

KHASI HILLS—Mann.

**Philadelphus coronarius** Linn.

A shrub with grey stems. *Leaves* opposite, 2.3-75 in. long, ovate-lanceolate, acuminate, distantly minute-toothed, thin, dark-green and glabrous above, paler and pubescent along the nerves or glabrescent beneath, strongest pair of lateral nerves sub-basal; petiole about .2-.3 in. long. *Flowers* tetramerous, white, up to 1 in. across, fragrant, usually 3 terminal and 1-2 pairs from upper leaf axils; pedicels up to .3 in. long. *Calyx* glabrous outside, tomentose at the apex within. *Petals* obovate. *Stamens* 20-40; filaments subulate. *Ovary* inferior; styles 3-4, united for about third their length.

Sometimes grown at Shillong for the flowers.

Flrs. 5.

**5. ITEA** Linn.

Shrubs or trees. *Leaves* alternate, glabrous, dentate or crenate. *Flowers* pentamerous, small, white, in many flowered terminal and axillary racemes. *Calyx tube* short, adnate to the base of the ovary; petals valvate. *Stamens* 5, perigynous. *Ovary* nearly superior, 2-celled; style short, simple; ovules many, axile. *Capsule* nearly free, conical or elongate; base only adnate to the persistent calyx, dehiscent through the styles and the dissepiments. *Seeds* elongate, with loose testa, which is more or less produced at their end.

Leaves usually large; petals recurved to the pedicel, never persistent in fruit; ovary glabrous. . . . .

1. *I. macrophylla*.

Leaves small to medium sized; petals erect, persistent in fruit; ovary pilose. . . . .

2. *I. chinensis*.

**1. *Itea macrophylla*** Wall. Vern. *Dieng-soh-tartet-shang-um*, *Dieng-la-met-heh*, *Dieng-lieh*, *Dieng-la-myllon*, Kh.; *Dieng-saru*, Synt.; *Phui-thing*, Lushai.

A small tree or large shrub. *Bark* greyish or brown to almost black with vertical fissures; blaze light red. *Leaves* 4.5-9 by 2.4-5 in., elliptic, elliptic-oblong or broad ovate, shortly acuminate, glandular-serrate, rounded to subacute at the base, glabrous, coriaceous; lateral nerves 8-12 on either half, tertiaries fine, subparallel; petiole stout, .5-1 in. long, stout, glabrous. *Racemes* 1-5 from upper leaf axils up to 8 in. long, pubescent when young, later on puberulous. *Flowers* white, .2 in. across; bracts subulate, up to .1 in. long, caducous; pedicels .05 in. long. *Calyx tube* puberulous,



obconic; teeth acute. *Petals* .1 in. long, oblong-lanceolate, closely reflexed on the pedicel between the calyx lobes. *Disk* intrastaminal, prominent, glabrous. *Ovary* glabrous. *Capsule* tapering to the style, .25-.4 in. long; base of the carpels usually sunk in the calyx tube; stigmas often cohering long after the splitting of the style; calyx teeth often ultimately weaving off.

KHASI HILLS 2-5,000 ft., LUSHAI HILLS (Tepaimukh), NORTH CACHAR HILLS (near Mahur), KAMRUP—Barduar Reserve.

Fls. 4-6. Fr. 11-2.

2. *Itea chinensis* Hook and Arn. Vern. *Dieng-la-met-rit*, *Dieng-soh-tyrtet-nong-shang*, *Dieng-niarli*, *Dieng-tem-sro*, Khasi.

A small tree (a shrub according to C. B. Clarke) with grey to almost black rough bark; blaze yellowish, turning brown. *Leaves* 2.4-5 by .7-2.2 in., elliptic, oblong, obovate or oblanceolate, usually shortly acuminate, distantly glandular, serrulate, acuminate, often abruptly cuneate at the base, glabrous, subcoriaceous; lateral nerves 5-8 on either side, tertiary subparallel; petiole channelled, .3-.5 in. long. *Flowers* white, about .15 in. across, yellowish white. *Racemes* 1-3 together on leaf axils, 1.2-2.5 in. long, puberulous; bracts up to .15 in. long, subulate, often with 1 or 2 linear lobes; pedicels up to .1 in. long. *Calyx tube* puberulous; teeth acute. *Petals* .1 in. long, erect in flower, lanceolate, persistent and often adpressed to the fruit. *Disk* thin, like the ovary, pilose. *Capsule* .3-.4 in. long, tapering, scarcely sunk in the calyx tube; calyx teeth persisting.

KHASI & JAINTIA HILLS—2,500-5,500 ft.

Fls. 4-5. Fr. 10.

## 6. RIBES Linn.

Shrubs, usually unarmed, sometimes prickly. *Leaves* alternate, simple, usually lobed, exstipulate. *Flowers* 1-2 sexual in racemes, solitary or clustered. *Calyx* 4-5 merous, superior; tube often produced beyond the ovary. *Petals* 4-5, inserted at the mouth of the calyx tube. *Stamens* 4-5. *Ovary* inferior, 1-celled; styles 2, free or connate; ovules numerous,

on 2 parietal placentas. *Fruit* ovoid or globose, crowned by the marcescent calyx.

Unarmed :—

Flowers unisexual (polygamo-diœcious,

Parker) :—

Racemes 1·3 in. long, erect in  
flowers, drooping in fruit. .. 1. *R. glaciale*.

Flowers bisexual :—

Racemes 3·8 in. long, pendent. .. 2. *R. Griffithii*.

### 1. *Ribes glaciale* Wall.

An erect shrub 5·8 ft. in height; stem shining, glabrous. *Leaves* 1·3 by 1·1·5 in., 3·5 lobed (not lobed Dr. N. L. Bor), ovate; lobes sharply inciso-serrate, acute or acuminate, membranous, glabrous or with scattered hairs above, pubescent along the nerves beneath; lateral nerves 2·4 on either half; base 3·5 nerved, cordate or occasionally truncate; petiole slender, 5·1·5 in. long. *Racemes* pubescent, erect and glandular, 1·5·3 in. long. *Flowers* about 15·2 in. across, greenish (drying brownish or reddish); bracts 2·25 in. long, longer than the pedicels. *Calyx* minutely pubescent; petals minute, clawed; limb obtuse; stamens exceeding the petals; style bifid. *Berries* acid, 2·25 in. across, smooth, glabrous.

MANIPUR (Watt No. 6587). NAGA HILLS (Sihpur No. 11420). AKA HILLS, PIRI MOUNTAIN—BALIPARA FRONTIER TRACT (Dr. N. L. Bor No. 774 & 788), (800-1,000 ft.).

Fls. 5-6. Fr. 7-8.

### 2. *Ribes Griffithii* Hk. f. & T.

A shrub or a small tree. *Leaves* 2·3·5 in. long, often as broad, 4·5 lobed (lobes acuminate inciso-serrate), membranous, pubescent on the nerves beneath; base 5 nerved, cordate; petiole 2·3·5 in. long. *Racemes* 3·8 in. long, lax, pendent. *Flowers* 15 in. across; pedicels about 07 in. long; bracts linear, lanceolate, exceeding the pedicels. *Calyx* campanulate, produced beyond the ovary. *Berries* ovoid or ellipsoid, 2·4 in. long, red.

AKA HILLS, PIRI MOUNTAIN, (BALIPARA FRONTIER TRACT), (Dr. N. L. Bor No. 793), (8,500 ft.).

Fls. 6. Fr. 8.

***Saxifraga ligulata* Wall. Vern. Jajaw-maw-ramsang, Khasi.**

A herb with a stout perennial creeping rootstock. *Leaves* simple, very variable in size, usually 6-12 in. long, orbicular to broadly obovate, fleshy, strongly ciliate, often pinkish beneath, glabrous, dotted beneath; petiole with a large sheath at the base. *Flowers* white or pink, waxy, .6-.8 in. across in corymbose scapes. *Calyx* persistent, adnate to the ovary at the base only; lobes 5, erect in fruit. *Stamens* 10, perigynous. *Petals* clawed. *Carpels* 2, united below; styles free, long; ovules numerous. *Ripe* carpels opening at the top on the ventral side.

KHASI HILLS—4,000-5,500 ft., not common, on rocks in cool shady situations.

Flrs. 3-4.

***Astilbe rubra* Hk. f. & T.**

An erect hairy herb up to about 3 ft. high with a perennial creeping rootstock; stem and leaf rachis with long reddish-brown hairs specially at the nodes of the leaf and pinnæ. *Leaves* alternate, 6-12 in. in length, 2-3 pinnate; pinnæ ternate, often with ternate leaves; pinnules towards the base; stipules adnate to the base of the common petiole, sheathing with membranous edges. *Leaflets* 1-2 in. long, ovate or terminal, sometimes rhomboid, acuminate or acute, coarsely biserrate, sometimes lobed; base subcordate or rounded to cuneate with rough hairs on both surfaces. *Flowers* small, about .2 in. long, pink, in long woolly pubescent terminal panicles of spicate racemes. *Calyx* 5 lobed, adnate to the base of the ovary, green at the base; teeth pink, erect. *Petals* 5, perigynous, narrowly strap-shaped, much exceeding the calyx lobes. *Stamens* 10. *Carpels* 2, united below for a great portion narrowed to the short style; ovules numerous. *Ripe* carpels dehiscing ventrally.

KHASI HILLS, 4,000-6,000 ft.

Flrs. 7.

***Astilbe rivularis* Ham.**

An erect herb attaining up to 4 ft. in height; stem and leaf with long reddish hairs. *Leaves* 10-21 in. long, ternately imparipinnate as in the last species with similar stipules. *Leaflets* 1-4 in. long, ovate or elliptic, terminal, sometimes obovate or rhomboid, acuminate, often caudate (in our area), biserrate, sometimes lobed, thinly coriaceous, rough on both surfaces; base cordate, rounded or cuneate, sometimes unequal. *Flowers* greenish-yellow, very small in woolly pubescent terminal panicles. *Calyx* 5 lobed, adnate to the base of the ovary. *Petals* 0. *Stamens* 5. *Carpels* 2, slightly united.

KHASI HILLS, 5-6,000 ft.

Flrs. 7-9.

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## FAM. 53. DROSERACEÆ.

Perennial glandular hairy herbs, insectivorous. *Leaves* radical or cauline; stipules 0, represented by hairs edging the dilated base of the petiole. *Inflorescence* various. *Flowers* regular, hermaphrodite. *Calyx* 4-5 (8) partite or free, imbricate, persistent. *Petals* as many as the sepals, hypogynous or nearly so, marcescent, imbricate in bud. *Stamens* as many as the petals, hypogynous or nearly so; filaments free or connate at the base. *Ovary* nearly free, globose or ovoid, 1-3 locular; style 3-5; stigma 2-fid or fimbriate; ovules numerous, usually on parietal placenta, anatropous. *Capsule* membranous, 3-5-valved. *Seeds* numerous, albumen fleshy; embryo minute.

### DROSERA Linn.

Perennial herbs, scapigerous, glandular—hairy. *Leaves* often rosulate, usually circinate in veneration. *Flowers* white or rosy. *Calyx* 4-8-partite, free from the ovary, imbricate. *Petals* 4-8, hypogynous or nearly so, marcescent. *Stamens* as many as the petals. *Ovary* free, 1-celled, placenta parietal; styles 2-5. *Capsule* loculicidally 2-5-valved. *Seeds* ovoid-ellipsoid; testa black, smooth, reticulate .

Leaves radical, rosulate, spathulate; styles 5, undivided.	.. .. .	1. <i>D. Burmanni</i> .
Leaves cauline, alternate, semiterminate, peltate; styles 3, fimbriate.	.. .. .	2. <i>D. peltata</i> .

#### 1. *Drosera Burmanni* Vahl.

Stem scarcely any. *Leaves* .2-.6 by .16-.3 in., tinged with red, all radical—rosulate, spathulate, clothed with curious gland-tipped tentacles; petioles flat; stipules scarious, scape 2-8 in. long, erect, rachis purplish, glabrous; pedicels slender. *Calyx* papillose, segments linear-oblong, obtuse. *Petals* white, spathulate; styles 5, undivided. *Capsule* 5-valved. *Seeds* numerous, minute, black, reticulate.

KHASI HILLS, SYLHET and GARO HILLS.

Flrs. 1-2.

**2. *Drosera peltata* Sm. in Willd.**

An erect herb. *Stem* erect, 3-12 in. high, leafy. *Leaves* alternate, peltate, with upturned cusps. *Racemes* subterminal, 2-6 in. long. *Flowers* white; pedicels slender, .2-.5 in. long. *Sepals* ovate, glabrous, erose or fimbriate. *Seed* similar to *D. Burmanni*.

KHASI HILLS 3-5,500 ft.

Flrs. 5-6.

**FAM. 54. HAMAMELIDACEÆ.**

Trees or shrubs often with stellate or fasciculate hairs. *Leaves* alternate, simple or palmately lobed; stipules 1-2, rarely wanting, usually deciduous. *Flowers* hermaphrodite or unisexual, collected into compact heads or spikes or close racemes, usually bracteate. *Calyx tube* adnate to the ovary, rarely free (Distylium), lobes small or 0. *Petals* 4-5 or 0, perigynous or nearly epigynous. *Stamens* 4-numerous, perigynous, rarely hypogynous (Distylium). *Ovary* 2-celled; styles 2, ultimately divaricate, persistent (deciduous in Altingia); ovules 1 to many, axile, pendulous. *Capsule* woody, dehiscing loculicidally at the apex and often also septicidally, endocarp often horny and separating from the exocarp. *Seeds* 1 or many when usually the lowest in cell is perfect, testa shining, endosperm usually thin.

All Indian genera of this family have bordered pits on the walls of wood prosenchyma like the conifers.

**1. Ovules solitary in each cell of ovary :—**

**A. Petals 0 :—**

Ovary superior. . . . .	..	..	<b>1. Distylium.</b>
Ovary half inferior. . . . .	..	..	<b>2. Sycopsis.</b>

## \*B. Petals 4-5 :—

Calyx tube adnate to the ovary :—

Leaves hazel-like, toothed. Flowers  
in spike-like racemes. Petals  
obovate-oblong under .3 in. ..  
Leaves entire. Flowers in heads.  
petals linear, .4-.6 in. long, much  
exceeding the calyx. .. ..

3. *Corylopsis*.4. *Loropetalum*.

## II. Ovules many in each cell of ovary :—

Leaves serrate. Petals 0 in both male  
and female flowers; stipules small,  
subulate; styles deciduous. .. ..  
Leaves entire. Petals present in  
hermaphrodite flowers; stipules large,  
persistent. .. ..

5. *Altingia*.6. *Bucklandia*.1. *DISTYLIUM* Sieb & Zucc.*Distylium indicum* Benth.

A small tree, ends of twigs rusty pubescent. *Leaves* 2.5-4 by 1.1-5 in., obovate or elliptic, tip rounded or gradually or abruptly acuminate, entire, coriaceous, glabrous (more or less stellate pubescent—*F. B. I.*); lateral nerves about 6 on either half, very faint above, the first pair subbasal and very oblique; base cuneate; petiole .2-.3 in. long, margined; stipules lanceolate, pubescent. *Racemes* axillary, upright, 1.5-2 in. long. *Flowers* polygamous. *Calyx* free, early deciduous; pedicels .3-.5 in. long (*F.B.I.*). *Stamens* hypogynous; styles 2, very long. *Fruit* immature, about .6 in. long, erect, covered with stellate pubescence.

KHASHI HILLS—Griffith—rare.

The above description has been based on a somewhat incomplete sheet (Griffiths 3397) at Calcutta Herbarium.

2. *SYCOPSIS* Oliv.*Sycopsis Griffithiana* Oliv.

A small tree with lenticellate branches; young parts and inflorescence clothed with minutely stellate pubescence. *Leaves* alternate, 2-4 in. by .8-1.6 in., lanceolate, acuminate; base narrowed to the petiole, coriaceous, thinly stellate pubescent along the nerves beneath, soon becoming glabrous or nearly so; lateral nerves rather indistinct, about 7-10 on either side, meeting in loops; petiole thinly stellate—pubescent

or glabrate; stipules about .2 in. long, linear-lanceolate, early deciduous. *Flowers* unisexual in short dense axillary spikes, both sexes in the same spike. *Male* calyx very small; petals 0. *Stamens* 8 (of which number several appear abortive); rudimentary ovary 2-fid.—*F.B.I.* *Female flowers*: calyx irregularly 5-lobed; lower portion of calyx tube adnate to the ovary, free portion pubescent within. *Petals* 0. Ovary 2-celled; styles 2, free; ovule solitary in each cell, pendulous. *Fruits* about .5 in. long, globose or ellipsoid with a hard endocarp more or less rugose and with stellate tomentose outside.

KHASI & JAINTIA HILLS—4000 ft., Cherrapunji, rare.

Fr. 6-8.

### 3. CORYLOPSIS Sieb & Zucc.

*Corylopsis himalayana* Griff. Vern. *Tiew-lang-lieh*, *Dieng-piur*, *Dieng-la-paiur*, Kh.

A large deciduous shrub or small tree with nearly smooth, grey or nearly white bark; young shoots, inflorescence and petioles silky villous with stellately fasciculate hairs. *Leaves* plicate in bud, 2.5-5 by 1.5-3.2 in., broadly ovate or ovate-oblong to orbicular, often oblique, acute or shortly acuminate; margin with excurrent hairy teeth, subcoriaceous, glabrous above, paler and fasciculate pubescent specially on the nerves beneath; lateral nerves 9-12 on either side, lowest 2 pairs from near the base, straight, sub-parallel, upper unbranched. lower always branching outwards; base more or less cordate, petiole .4-1.5 in. long; stipules lanceolate-membranous, .6-1 in. long, adpressed silky within, deciduous. *Flowers* bisexual, pentamerous, about .3 in. across, pale-yellow in drooping catkin like spikes, 1-2 in. long, which when young are enclosed within membranous, elliptic-acute or lanceolate scales, .5-7 in. long, resembling the stipules, each flower subtended by a villous concave bract up to .2 in. long. *Calyx tube* adnate to the ovary, hairy, ribbed in fruit, lobes acute, deciduous. *Petals* obovate-oblong, or obovate-spathulate, clawed, .2-.25 in. long. *Stamens* 5, with a number of reddish scale like staminodes; anthers separated by broad connectives. *Ovary* free at the top, 2-celled; styles

2, soon divaricate; ovule 1 in each cell, pendulous. *Capsule* woody, about .25 in. across, endocarp separating from the horny endocarp. *Seeds* with black testa.

KHASI HILLS, 5,000- about 6,500 ft.

The flowers are eaten by the Khasis cooked as vegetable.

Flrs. 1-3. Fr. 6.

*Corylopsis manipurensis* Hemsl. in Hooker's *Icones Plantarum*.

A shrub. *Leaves* appearing with the flowers, (immature only seen) 1.8-2.5 in. long, obovate, acuminate, glabrous or soon glabrescent above, pilose with long hairs on the nerves beneath; petioles slender, .2-.4 in. long; stipules .6-.8 in. long, glabrous outside, sericiopilose within. *Racemes* terminating branches, 1.7-2.25 in. long, pilose; bracts and bracteoles densely silky hairy on both surfaces. *Petals* oblanceolate, .3-.4 in. long, clawed, much exceeding the calyx and stamens; scales 10.

MANIPUR—Watt!

Flowers 4.

Differs from *C. himalayana* by its leaves appearing with the flowers, solitary petal.

#### 4. LOROPETALUM Br.

*Loropetalum chinense* Oliv. Vern. *Dieng-jala-um*, Kh.

A large evergreen shrub or small tree; bark grey, thin; branchlets and inflorescence densely stellate pubescent. *Leaves* alternate, 1.2-5 in. by .7-1 in., lanceolate to elliptic or obovate acute or acuminate, subentire or minutely toothed, glabrous above, paler and stellate pubescent, more densely on the nerves beneath; lateral nerves 5-7; petiole .1-.2 in. long, soon deciduous. *Flowers* small, greenish white, bisexual, tetramerous, sessile, 6-8 together in heads, which when fully expanded are about 1 in. across. *Heads* terminal or axillary or in short racemes of 2-3; peduncles about .2 in. long. *Calyx* .1 in. long, tube adnate to the ovary, tomentose, lobes longer than the tube, valvate, up to about .15 in. long. *Petals* .4-.6 in. long, linear, much exserted, white. *Stamens* 4, perigynous; filaments very short, connective produced into a horn from the anthers, short, edges of the valves bending and adhering to the connective. *Ovary* half inferior, 2-celled; styles 2, soon divaricate; ovule 1 in each cell. *Capsules*



1-4 per head, subsessile, .3-.4 in. long, rusty, stellate-tomentose, obovoid.

KHASI HILLS, 4-5000 ft. rare, Nongkhlaw, Mawrynkneng—Prain.  
Flrs. 3-4.

### 5. ALTINGIA Noronha.

*Altingia excelsa* Noronha. Vern. *Duang, Jutuli*, Ass.; *Jikri*, Mik.; *Yogir-asing*, Miri; *Siri-asing*, Abor; *Sangri-changne*, Duff.

A very tall aromatic tree attaining a girth of over 17 ft. in favourable situations. *Bark* light to dark grey or brown, exfoliating in large flakes; blaze brown; youngest shoots pubescent, soon becoming glabrous; branches with large lenticels. *Leaves* 3-6.5 by 1.3-2.5 in., lanceolate, elliptic or ovate, caudate or sharply acuminate, serrate; base rounded or narrowed, glabrous, but usually with tufts of hair on the nerve axils; lateral nerves 7-10 on either half, meeting in loops near the margin; petiole .5-1.5 in. long, slender; stipules up to .3 in. long, adnate at the base, free end subulate, deciduous. *Flowers* unisexual in dense heads in short spikes or racemes, supported by large silky bracts, each consisting of a fleshy axis supporting a mass of closely packed anthers with very short filaments. *Female* heads on long peduncles, solitary, axillary at the ends of branches, many flowered. *Calyces* confluent, limb 0. *Petals* 0. *Ovary* free only at the top, 2-celled; styles 2, deciduous; ovules numerous, axile. *Fruit* head globose, rough, woody, about .5 in. across. *Capsules* brown, tomentose; seeds numerous, only 1-2 in each cell, fertile; fertile seeds winged.

UPPER ASSAM from N. E. FRONTIER to SIBSAGAR, sometimes gregarious, e.g., Charduar in DARRANG.

The wood is hard, cross grained. It is cut up into planks when green which is very good for indoor work when not in contact with moisture. The weight (Assam) is about 45 lbs. per c. ft.

The young leaves are red. It yields the resin known as "Storax," which is contained in canals, which accompany the vascular bundles to the last ramifications and in the stem run along the circumference of the pith—Brandis.

Flrs. rainy season. Fr. 2-5.

## 6. BUCKLANDIA Br.

**Bucklandia populnea** Br. Vern. *Dieng-doh*, *Dieng-myntat*, Kh.; *Dieng-soh-ryndoh*, Synt.

A medium-sized to tall handsome tree; bark grey or brown to almost black, rough, coarse fibred, hard; blaze reddish-brown with white lines. *Branchlets* green, glabrous. *Leaves* 4·5-7 by 3·5-8 in., broadly ovate to nearly orbicular, sharply acuminate, sometimes 3-cuspidate, specially in young plants, entire with a semitransparent cartilaginous margin, dark glossy green above, silky when very young, but soon glabrous on both surfaces or sometimes with few dark reddish, adpressed hairs, persisting on the nerves beneath, coriaceous; lateral nerves 3-4 (excluding basal); base truncate, subtruncate or retuse. 5-7 nerved; petiole 1-3 in. long, terete, stout; stipules 7-1·5 in. by 4-7·5 in., coriaceous, somewhat obliquely obovate-oblong, often minutely punctate, concealing the silky buds, deciduous. *Inflorescence* of 2-5 peduncled heads on a very short axis, enclosed at first by the stipules, densely rusty pubescent, when young, nearly glabrate with age; peduncles 6-1 in. long. *Flowers* polygamous, 8-20 in a head, more or less connate by their calyces. *Calyx tube* adnate to the ovary; limb of 5 lobes. *Petals* in the hermaphrodite flowers variable in number, linear—spathulate, rudimentary in the female flowers. *Stamens* 10-14, absent in female flrs.; filaments long. *Ovary* half inferior, 2-celled, exposed portion brown silky; styles 2, free, soon divaricate; ovules 6-8 in each cell. *Capsule* free, except at the base, woody, subglobose with horny endocarp, which has a tendency to separate from the exocarp; upper seeds in each cell not winged, sterile, lowest winged and fertile.

KHASI HILLS—5000-6000 ft.; common but nowhere plentiful.

Wood weighs about 45 lbs. per c. ft. (Gamble). It is reddish-brown, close grained, with very fine and close medullary rays. The timber is durable and is in considerable demand in the Darjeeling District for planking and door and window frames. It does not ordinarily grow to much size in our area. About 7000 seeds weigh 1 oz.

Flrs. & Fr. 11-12, but also at other times of the year.

## FAM. 55. RHIZOPHORACEÆ.

Trees or shrubs, generally glabrous. *Leaves* opposite, entire, coriaceous; stipules interpetiolar, deciduous. *Flowers* regular, usually bisexual. *Calyx* more or less adnate to the ovary, less often free, 4-14 toothed or lobed, persistent. *Petals* as many as the calyx lobes, often 2 fid or lacinate; stamens usually twice as many as the petals, rarely indefinite; filaments free. *Ovary* 5-1 celled by disappearance of the septa; styles usually connate; ovules pendulous, usually 2 in each cell. *Fruit* coriaceous, usually 1-celled, 1-seeded.

### CARALLIA Roxb.

*Carallia lucida* Roxb. Syn. *C. integerrima* DC. Vern. *Mahi-thekra*, *Kathal-boula*, *Daini-jam*, Ass.; *Thai-daukri-phang*, *Kala-jam*, *Oima-thepo-baphang*, Cach.; *Thengu-thung-arong*, *Thengbu-thung*, Mik.; *Theiril*, *Thei-lai-kol*, Kuki; *Saksimaring*, *Chok-chim-arong*, *Bol-neng-rang*, *Thekra-aga*, Garo; *Dieng-soh-lang-bali*, *Dieng-soh-syllih*, *Matam*, Kh.; *Matang*, Sylh.

A medium sized to small tree, often with branches of adventitious roots on the trunk; bark brownish, often with horizontal wrinkles, nearly smooth on old trees, light grey and corky on younger stems; blaze pale light or orange brown, turning dark brown on exposure. *Leaves* 3-7 by 1-3-3-2 in., elliptic or elliptic obovate, usually bluntly and rather abruptly short acuminate or sometimes obtuse, entire or serrulate near the apex, margins usually recurved, coriaceous, glabrous, shining, with dark dots on the undersurface; lateral nerves fine, 10-14 on either side, indistinct until dry with many intermediates, arching; petiole .2-.4 in. long, stout, margined. *Flowers* sessile, creamy white, 6-8 merous, about .2 in. across, in short peduncled compound trichotomous cymes; peduncles and pedicels stout. *Calyx* tube minutely bracteate at the base; limb 5-8 lobed; lobes erect, valvate. *Petals* 5-8, orbicular, erose, inserted on the calyx, on the

margin of a crenulated 10-16 lobed disk, which lines the latter. *Stamens* 10-16, inserted with the petals; filaments filiform. *Ovary* inferior. *Fruit* about .2 in. across, globose, 1-celled, 1 seeded.

Wood handsome, hard, red with broad prominent regular medullary rays with few fine short ones between, said to be good for furniture and cabinet making. 840-980 seeds weigh 1 oz.

Sometimes large depressed globose gall fruits about 1 in. across are formed. These become very succulent before dropping off and are then eaten. The epithet *Thekra* to the name may not inconveniently have arisen from mistaking this for a species of *Garcinia*.

Flrs. 12-2.

## FAM. 56. COMBRETACEÆ.

Trees or shrubs, sometimes scandent. *Leaves* opposite, subopposite, less often quite alternate, extipulate, sometimes with peltate scales or dots beneath. *Flowers* generally small, bracteolate at the base, sometimes polygamous in spikes, heads or racemes, the latter often paniced. *Calyx* tube adnate to the ovary and often prolonged above it, sometimes to a great length, often broadened towards the end; lobes 4-5, valvate. *Petals* 4-5 or 0, inserted between the calyx lobes. *Stamens* 4-5 or twice the number. *Ovary* totally inferior, 1-celled; style simple; ovules few, pendulous from the apex of the cell. *Fruit* indehiscent, drupaceous or coriaceous, angled or commonly winged, sometimes crowned by an accrescent calyx. *Seed* 1; endosperm 0. *Cotyledons* often convolute.

### I. Calyx limb deciduous :—

#### A. Trees, leaves alternate or subopposite.

##### Petals 0 :—

Flowers in spikes.	..	..	1. <i>Terminalia</i> .
Flowers in globose heads.	..	..	2. <i>Anogeissus</i> .

- B. Scandent or straggling shrubs; leaves opposite, petals as many as calyx lobes :—  
 Flowers 4-5 merous; petals small, tube of calyx limb above the ovary not long. .. 3. *Combretum*.  
 Flowers 5 merous; petals conspicuous, tube of calyx limb above the ovary, usually long and slender. .. 4. *Quisqualis*.  
 II. Calyx limb accrescent in fruit :—  
 Petals 0. Diffuse scandent shrub. 5. *Calycopteria*.  
*Illigera* has been included under *Hernandiaceæ*.

### 1. TERMINALIA Linn.

Large trees. *Leaves* subopposite, opposite or alternate, sometimes crowded at the ends of branches, entire or slightly crenulate, often with glands at the base of the blade or on the petiole. *Flowers* small, hermaphrodite or sometimes the upper flowers of the spike male, greenish, in simple or panicled spikes; bracts narrow, caducous. *Calyx tube* constricted and produced above the ovary with a campanulate limb and 5 short lobes. *Petals* 0. *Stamens* 10, in two series, inserted on the calyx tube; filaments exserted; disk epigynous, hairy, lobed within the stamens. *Ovules* 2-3, pendulous. *Fruit* drupaceous or dry, smooth or angular or with 2-5 wings.

- I. Fruits not winged :—  
 A. Drupes tomentose globose; leaves clustered at the ends of branches. Spikes never panicled. .. 1. *T. belerica*.  
 B. Drupes smooth not globose, leaves not clustered at the ends of branches. Spikes often panicled :—  
 Glands on the petioles not prominent, areoles between nervules of leaves not felted. .. 2. *T. Chebula*.  
 Glands on the petioles prominent, areoles between the nervules of leaves white with minute felt. .. 3. *T. citrina*.  
 II. Drupes winged :—  
 Deciduous; drupe large over 1.5 in. long with broad wings. .. 4. *T. tomentosa*.  
 Evergreen; drupe very small, scarcely .15 in. long with small wings. .. 5. *T. Myriocarpa*.

1. *Terminalia belerica* Roxb. Vern. *Bibhitaki*, *Bahe-ruka*, Sans.; *Bondoureja*; *Babraiphang*, Kach.; *Kuru*, *Garu-*

*arong*, Mik.; *Logio-asing*, Miri; *Bhamora*, Bowa, *Bhoira*, *Dubong*, *Silli*, Ass.; *Dieng rinyan*, *Dieng-soh-khoru*, *Dieng-soh-kong-khru*, Kh.; *Khung-khli-thing*, *Bakhalla*, Kuki; *Bakhla*, Tipp.; *Baura*, Mech; *Churi*, *Bol-churi*, *Bolsuiri*, *Bolbadok*, *Bol-chirore*, Garo; *Bhengragota*, Jharua; *Barra*, Nep.; *Bahera*, Hind.; *Bohera*, Beng.

A large deciduous tree, sometimes buttressed at the base. *Bark* ashy dark-grey or brown, rough, exfoliating in irregular brownish small scales. *Blaze* pale yellow, turning brownish on exposure; young parts and inflorescence rusty tomentose. *Leaves* alternate, clustered at the ends of branches, 3-10 by 2-5 in., obovate to broadly elliptic, obtuse, subacute or apiculate at the apex, margin with a pellucid rim, coriaceous, puberulous when young, dark green and glabrous when mature, often punctate above when mature; lateral nerves 5-8—sometimes up to 10 on either half; base narrowed, often inequal; petiole 1-3·5 in. long, glands absent or inconspicuous. *Flowers* ·25 in. across, greenish yellow with an unpleasant smell, in slender axillary and extra-axillary interrupted drooping spikes from new shoots, 3-6 in. long, and hermaphrodite upper flowers often male; bracts minute, villous, caducous. *Calyx* hairy outside, woolly within, about ·25 in. across; limb cup-shaped, expanded, teeth 5, triangular. *Drupe* about 1 in. long, globose, often abruptly narrowed to a short stalk, grey velvety, obscurely ribbed when dry.

Throughout the province.

The fruit is the Belleric Myrobalan of commerce. It is largely used in indigenous medical practice. The kernel is edible but it is said to have narcotic properties. It yields an oil. The wood is yellow when freshly cut, turning yellowish or greyish brown. Medullary rays fine, pores joined by fine concentric lines. The timber is not durable but can be used for packing cases, posts for buildings, etc.

New leaves often copper coloured. Flrs. hot season after new leaves. Fr. 12-2.

**2. Terminalia Chebula** Retz. Vern. *Silikha*, Mech; *Artak*, Garo; *Halagach*—, Jharua; *Haritaki*, Beng. and Sans.; *Harra*, Hind.

A medium sized deciduous tree; bark grey or almost black, rough and furrowed outside; inside fibrous and reddish-brown, with a thin yellow layer near the cambium; young

parts shining, rusty, pubescent. *Leaves* 3-7·5 by 2-3·75 in., sub-opposite or alternate, acute, elliptic or ovate-oblong or shortly acuminate, silky when very young, glabrous with age; coriaceous; lateral nerves 6-12 on either half, arcuate, prominent; base rounded or cuneate, sometimes unequal; petiole ·5-1 in. long, usually with two sometimes more glands towards the top. *Spikes* usually 2-5·5 in. long, terminal or from upper leaf axils on new shoots, often paniced, sometimes fascicled, rusty pubescent when young. *Flowers* about ·1-·15 in. across with an offensive smell, all hermaphrodite; *bracts* linear, deciduous. *Limb* of calyx tube expanded and cup-shaped, glabrescent outside, villous inside. *Drupe* 1-2 in. long, obovoid or ellipsoid, smooth, more or less 5 ribbed, yellowish green when ripe; stone obscurely angled, rough, bony with gum vessels in the Walls.

Deciduous forests - GOALPARA, GARO-HILLS, KAMRUP.

The fruit is the Chebulic Myrobalan of commerce and is one of the best tanning materials we have. It is also largely used in medicine as a laxative, alterative and tonic. The unripe fruit on account of its astringent and aperient properties is a useful medicine for diarrhoea and dysentery. Water in which the fruits have been steeped overnight is a cooling wash for eyes affording relief in conjunctivitis and similar affections of the eye. The kernel yields a transparent oil. Wood very hard "brownish grey" with greenish or yellowish touch, heartwood dark purple, durable—it is used for furniture, carts, agricultural implements and house building—*Gamble*. The wood takes a good polish.

The tree varies a great deal in the pubescence of leaves and calyx and size and angularity of the fruit and apparently several forms if not varieties exist. 60-75 dry seeds go to the lb.

Flrs. hot season. Fr. 2-3 next year.

**3. *Terminalia citrina* Roxb.** Vern. *Senemphang*, *Suluka-baphong*, *Silika*, *Hartaki*, Cach., *Meng-suri-arong*, *Cheluka-arong*, Mik., *Soh-salukah*, *Soh-kykat*,? *Soh-Hardudiengartaki*, Kh.; *Logio-asing*, *Hil kang-asing*, Miri & Abor; *Hilikha*, Ass.; *Monalu*, Manip.; *Rerora*, Lush.; *Bekhla*, Tipp.; *Phakala*, *bakhla-rahtol*, Kuki; *Hartaki*, Sylh.; *Aritok*, *Bolomit*, Garo.

A medium sized to large deciduous tree, often with buttressed stem attaining 80 ft. in height. *Bark* grey or brown, slightly vertically fissured outside, light yellow, turning

brown and fibrous inside, about .3 in. thick. *Young* shoots shining, rusty or brown pubescent, soon glabrate. *Leaves* subopposite, 3-7.5 by 1.3-4 in., lanceolate or oblong-lanceolate to elliptic, acute or shortly acuminate; pubescent when young, glabrous and shining when mature; lateral nerves 8-12 on either half, curving upwards, nervules very finely reticulated, areoles white with very minute felt; base cuneate or rounded; petiole .4-1 in. long, biglandular, glands prominent, round. *Spikes* deciduously rusty puberulous, paniced at the ends of shoots with lower branches axillary or sometimes solitary and axillary. *Flowers* about .2 in. across, sessile, all hermaphrodite, each with a small linear silky pubescent deciduous bract, those towards the bottom of the spikes spatulate and larger downwards. *Calyx* glabrous outside, rusty villous within; limb broad, cupular; teeth 5, erect. *Drupe* 2-3 by .75-1 in., oblong-lanceolate, slightly clavate, smooth, glabrous, obscurely 5-ridged.

Throughout the province ascending to about 1500 ft. in the KHASI HILLS, often confused with *T. Chebula*.

Fruits are used medicinally similar to those of *T. Chebula*.

Flrs. 6-7. Fr. 1-2.

**4. *Terminalia tomentosa* W & A.** *Terminalia tomentosa* Bedd. Var. *typica*. Vern. *Kushi-bom-phang*. Mech.

A large to medium sized deciduous tree. *Bark* brown or grey, sometimes almost black, deeply furrowed, 1.1-5 in. thick; inside red, deeper layers paler, fibrous. *Young* parts rusty tomentose. *Leaves* subopposite, 4.5-9 by 2.5-4 in., oblong or elliptic or obovate-oblong, apex obtuse, broadly acute or short acuminate; entire or sometimes serrulate, silky pubescent and glabrescent with age above, more or less hairy specially along the nerves (in the form found in our area) beneath; lateral nerves 12-20 on either side; base often unequally cordate; petiole .25-.4 in. long, usually with 1-2 turbinate often stipitate glands at the junction with the midrib. *Flowers* about .15 in. across, dull yellow, bisexual; spikes erect, pubescent, paniced on the new shoots, lower branches from leaf axils; bracts subulate. *Calyx* hairy or glabrescent outside; limb cup-shaped, usually broader than long; teeth acute, hairy inside. *Drupe* 1.5-2.5 in. long,



with 5 coriaceous wings, .5-1 in. broad and marked with close horizontally parallel striations.

GOALPARA in mixed forests.

Heart-wood dark purplish-brown with darker streaks bleaching to a greyet tint on exposure. It polishes well and is then very handsome. It is generally used for house-building, agricultural implements, etc., in many parts of India but could be used also for panelling, decorative and furniture work. It is however liable to crack unless thoroughly seasoned. 150-250 seeds weigh a lb.

New leaves 3-5 Flrs. 4-6. Fr. 2-3.

**5. Terminalia myriocarpa** Heurck et Muell. Vern. *Holok*, Ass.; *Jhaluka*, Ass.; *Dieng-marao-ditar*, *Dieng-lang-sing-d-khar*, *Dieng-tal*, kh.; *Silok*, Miri and Abor; *Chalabophong*, *Jhalna*, Cach.; *Turtung arong*, Mik.; *Jhalna*, Manipur; *Chorpui*, Lush.; *Rakseng*, Garo.

A very large evergreen tree with pendulous branchlets; outer bark grey or brown, rough, peeling in vertical flakes; inside red, pale yellow towards the cambium, fibrous. Young parts and inflorescence rusty pubescent. Leaves 4-9 by 1.5-3 in., oblong-lanceolate to elliptic oblong, acute or shortly acuminate, denticulate or entire; lateral nerves many, about 25-36 on either side, subparallel, those near the base more straight; base inequal, narrowed, often subcordate, coriaceous, glabrous or with few hairs along the nerves; petiole thick, about .25-.3 in. long with 1-2 elongated glands near the top. Flowers .15 in. across, pink, each in the axils of a small lanceolate or deltoid subulate bracteoles. Spikes slender, lax, arranged in ample panicles, which are terminal and from upper leaf axils; upper bracts spatulate, lower gradually larger and leafy. Limb of calyx tube expanded, glabrous or nearly so outside, pubescent within; teeth erect; disk with few or no hairs; ovary pubescent. Drupe .15 in. long, yellow, 3 cornered, the lateral corners developing into short wings; .3-.5 in. across the wings.

In evergreen forests throughout ascending to about 2,000 ft. in the KHASI HILLS. "A very handsome tree in flower or fruit that is either loaded on its pendent boughs with pink flowers or yellow fruit"—Gamble.

Heart-wood brown with dark streaks, polishes well. The timber is fairly durable and is well adapted for cheap furniture, doors, windows,

railway carriages, tea boxes, house-building, etc. It makes excellent charcoal. Av. weight about 53 lbs. per c. ft. About 4,000-5,000 seeds weigh 1 oz.

Flrs. 10-11. Fr. 2-5.

**Terminalia Catappa** Linn. The Indian Almond Tree.—A tall tree with rough bark, stem often buttressed. *Leaves* 6-9 in. by 3-5-5 in., obovate or obovate-oblong from a narrow cordate base, softly hairy when young, glabrescent with age; midrib sometimes with 2 depressions near the base on the under side; petiole .5-.75 in. long, short, stout, channelled. *Flowers* white; spikes axillary, upper flowers male and shortly pedicelled, lower bisexual. *Calyx* glabrous outside. *Drupe* 1-2 in. long, glabrous, ellipsoid, slightly compressed, keeled all round, endocarp hard, kernel edible, oily.

Sometimes cultivated for fruits in plains districts.

Flrs. 3-5. Old leaves turn a beautiful crimson colour before dropping in January and February.

## 2. ANOGEISSUS Wall.

### **Anogeissus acuminata** Wall.

A large graceful tree usually with pendulous branches. *Bark* grey, rough, about .75-1 in. thick; inside reddish brown, fibrous; shoots, branchlets and inflorescence softly adpressed tomentose. *Leaves* 1-5-3 by .5-1-2 in., sub-opposite, bifarious, oblong- to ovate-lanceolate, acute or sharply acuminate, entire, punctate, clothed with soft spreading hairs or nearly glabrescent above, with age, thin, translucent dotted (due to crystal cells); lateral nerves 5-7 on either side, arcuate; petiole up to .25 in. long, pubescent. *Flowers* very small, bisexual in globose peduncled heads up to .75 in. across. *Peduncles* axillary, solitary or sometimes two together, as long as the heads. *Bracts* at the base of the head, ovate-lanceolate to spatulate up to .15 in. long, brown tomentose; bracteoles minute, woolly, spatulate. *Calyx* superior, calyx tube pubescent, narrowed and prolonged above the ovary as a persistent beak with an expanded and deciduous campanulate 5-cleft limb, which is glabrate outside and woolly within. *Petals* 0. *Stamens* 10 in 2 series; filaments exserted. *Ovary* 1 celled with 2 pendulous ovules; style simple. *Fruit* .15-.3 in. across, samaroid, broader than long (with wings), coriaceous, broadly 2 winged with a beak, which is slightly longer than or about as long as the fruit,

glabrous except for the villous apical portion at the base of the beak; wings membranous, often irregularly denticulate at the edges; seed 1.

Chatta-chura Hill, NORTH CACHAR, Lambabak-LUSHAI HILLS.

Wood is used for cart axles and ploughs. It is moderately hard grey or yellow grey, warps and cracks in seasoning, not durable when exposed to wet. Av. weight about 50 lbs. per c. ft.

**A. sericea** Brandis.

A large tree; young shoots silvery; fl. heads axillary, generally single on long peduncles, frequently bearing leafy bracts. *Fruits* (not seen), tomentose with wings broader than long; wings jagged. *Calyx* often persistent at the end of the long tube.

Longai Reserve—SYLHET.—C. S. Purkayastha.

Fls. 3.

**3. COMBRETUM** Linn.

Usually large straggling or scandent shrubs. *Leaves* usually opposite, rarely ternate or alternate, entire, petiolate. *Flowers* 4-5 merous, hermaphrodite or polygamo-dioecious, usually in paniced or simple spikes; bracts often large; bractoles small. *Base* of calyx tube adnate to the ovary, 4-5 angled, constricted and more or less produced above the ovary; limb expanded, cup-shaped, funnel-shaped or campanulate, deciduous. *Disk* at the base of the calyx limb or lining it and then ending in a hairy ring. *Petals* inserted between the calyx teeth, rarely 0. *Stamens* twice as many as the petals, inserted on the disk. *Ovary* 1-celled; style subulate; ovules 2-5, pendulous from the top of the cell. *Fruit* 4-5 winged or ridged, dry, generally indehiscent; wings membranous.

**I. Flowers 5-merous with 5 membranous wings :—**

Bracts creamy white; calyx limb abruptly cup-shaped. . . . . 1. *C. decandrum*.

Bracts greenish, calyx limb gradually broader upwards and funnel-shaped. . . . . 2. *C. pilosum*.

**II. Flowers 4-merous—fruit with 4 ridges :—**  
Disk at the base of the calyx limb not ending in a villous ring; calyx squamose outside. . . . .

3. *C. acuminatum*.

III. Flowers 4-merous, fruit with 4 wings :-  
Disk lining the calyx limb and ending  
in a villous ring at the throat :-

A. Surface of fruits with fibrillar  
scales; calyx squamose; petals  
obovate, much longer than the  
calyx teeth. . . . .

4. *C. flagrocarpum*.

B. Surface of fruits without elongated  
fibrillar scales :-

1. Limb of calyx squamose, petals  
longer than or about as long as  
calyx teeth :-

a. Base of leaves never  
cordate :-

Young parts and in-  
florescence densely cover-  
ed with copper coloured  
pale or peltate scales;  
calyx limb with a short  
tube, petals linear-  
spatulate, acute at apex.

5. *C. squamosum*.

Young parts and inflore-  
scence sparsely dotted  
with glands, mature  
leaves slightly squamose  
or without glands; petals  
obovate. . . . .

6. *C. chinense*.

b. Base of leaves narrowed  
and cordate :-

Young parts villous,  
petals obovate. . . . .

7. *C. dasystachyum*.

2. Limb of calyx not squamose;  
petals minute and shorter than  
the calyx teeth, oblong-truncate  
and usually notched at apex :-

Tube of calyx limb much  
elongated, mature leaves  
not squamose, never cord-  
ate at the base. . . . .

8. *C. extensum*.

1. **Combretum decandrum** Roxb. Vern. *Lota-chali*,  
*Jonari-lewa*, *Jangta*, *Dhuna-sali*, *Tita-sali*, *Dhenai-sali*, *Droa-  
chali*, *Dhoba-lota*, *Bain-lewa*, Ass., *Arkeng-arong*, *Namarkeng*.  
Mik.; *Ther-sali*, *Mei-long-kha-saw*, Kh.; *Dugi-shing*, *Du-grak*,  
Garo; *Bandarebhra*, Nep.; *Koldam-hrui*, Lush.; *Damkol*,  
Tipp.

A large evergreen woody climber; young parts and  
inflorescence brown, silky-villous. *Bark* reddish-brown, peel-

ing off in thin flakes. *Leaves* opposite, 3-6 by 1·3-3 in., elliptic or elliptic to lanceolate, oblong, abruptly short acuminate, coriaceous, glabrous or with tufts of hair on the nerve axils, sometimes also sparsely pubescent on the midrib and the nerves beneath; lateral nerves 6-8 pairs, prominent beneath, arcuate, joined by numerous subparallel fine tertiary; petiole ·2·4 in. long. *Flowers* greenish-white, pentamerous, about ·2·25 in. across, in dense spikes up to 3 in. long, usually arranged in terminal and axillary panicles, sometimes simple and fascicled from leaf axils. *Bracts* opposite, creamy-white, leaf-like, up to 3 in. long, upper gradually smaller, pubescent; bracteoles sub-persistent, villous, linear spatulate, acuminate, up to about 2 in. long. *Calyx* about ·15 in. long, hairy outside, expanded above the ovary into a cup-shaped limb, which is pubescent within, lobes abruptly linear acuminate from a broad base. *Disk* lining the base of the calyx limb, pubescent. *Petals* 5, slightly exceeding the calyx lobes, oblong or oblong-lanceolate, acute or acuminate, hairy. *Fruit* about 1 in. long with 5, less often 4 papery wings, each ·25·3 in. broad.

. Throughout the province, ascending to 1,500 ft. in the KHASI HILLS.

The bark is said to be chewed as substitute for betel nut.

Flrs. 11-1. Fr. 3-4.

## 2. *Combretum pilosum* Roxb.

A scandent shrub; branchlets clothed with soft rusty or brownish spreading hairs. *Leaves* opposite, 3·8-8 by 2·3 in., oblong-lanceolate to elliptic oblong, shortly acuminate, entire; coriaceous, shining, pubescent on the mid-rib and the nerves or glabrescent above and more thinly beneath, punctate and minutely papillose on the upper surface; lateral nerves 6-8 on either side, ascending, curved; base-cordate or retuse, slightly narrowed; petiole stout, ·2·3 in., hairy. *Flowers* ·6·7 in. long, 2-sexual, 5-merous, densely crowded in rusty or fulvous, silky-villous spikes, which are paniced at the ends of branches or from upper axils; bracteoles densely pilose, lanceolate or subulate-lanceolate up to ·25 in. long. *Calyx* limb ·4·5 in. long, funnel-shaped from a shortly constricted base, 5-ridged and pubescent with soft hairs outside and below the

throat inside. *Calyx lobes* triangular, acuminate, about  $\cdot 1\cdot 12$  in. long. *Disk* lining the base of the tube. *Petals* exceeding the calyx lobes about  $\cdot 2$  in. long, oblong or narrow-obovate-obtuse, light pink, silky pubescent on the backs. *Stamens* 10, unequal, exserted, in 2 series, upper opposite the petals inserted between the calyx-lobes, lower alternating with them, basal portions adherent to the grooves formed by ridges of the calyx limb. *Ovary* 1-celled, pilose outside with spreading hairs; style exserted, pilose, slightly adnate to the calyx limb; ovules 2-or 1 by suppression, from the apex of the cell, suspended by long funicles. *Fruit*  $1\cdot 1\cdot 25$  in. long, elliptic or ovate oblong with 5 chartaceous wings almost as broad as or broader than long.

Foot of KHASI and JAINTIA HILLS—Tharia, Bholaganj; SIB-SAGAR, Ranga-pahar Reserve.

Flrs. 1-2

**Var. *spinescens*** with stout spines at the base of the branchlets—Keenan.

### 3. *Combretum acuminatum* Roxb. Vern. *Nahar-lata*, Ass.

Large woody climber with grey bark; young parts puberulous. *Leaves* opposite,  $4\cdot 7\cdot 5$  by  $1\cdot 3\cdot 4$  in., ovate or elliptic, oblong to oblong-lanceolate, acuminate, coriaceous, glabrous or puberulous along the midrib and nerves on the under surface, which is also minutely glandular or scaly punctate; lateral nerves 10-15 on either side, tertiaries strong, scalariform; base rounded, subcordate or acute; petiole  $\cdot 2\cdot 4$  in. long, stout. *Spikes* usually 1-3 in. long, axillary and simple or forming leafy panicles at the ends of branches, pubescent and more or less dotted with minute round scales; bracteoles small, caducous. *Flowers* 4-merous,  $\cdot 25$  in. across. *Calyx* dotted with minute round scales, puberulous and more densely scaly at the base; limb scarcely constricted above the ovary, campanulate; teeth erect, acute; disk at the base of the limb. glabrous or nearly so. *Petals* narrowly oblanceolate, acute, a little longer than the calyx teeth. *Fruit* 1-2 in. long,  $\cdot 4\cdot 6$  in. broad, narrowly ellipsoid-narrowed at either end, bluntly 4 ridged, fluted between the ridges, brown.

SIBSAGAR, GOALPARA. Guma Reserve, LAKHIMPUR, KHASI HILLS up to 2,000 ft.

Flrs. 2-3. Fr. 7.

**4. Combretum flagrocarpum** Herb. Cal. *Tilli-lieh*, Synt.; *Arkeng-rekang*, Mik.; *Dugrak*, Garo; *Dukha-gajao*, Cach.; *Tairel*, *Rhui-keng-rathol*, Kuki.

A large straggling or scandent shrub; young parts and inflorescence pubescent or tomentose and also covered with round copper coloured or pale peltate scales. *Leaves* opposite, 3·7-7 by 1·7-3·5 in., elliptic to elliptic-oblong or ovate to obovate-lanceolate, more or less abruptly acuminate; thinly coriaceous with resinous dots on both surfaces—more numerous beneath, pubescent along the nerves or glabrescent above with age, tomentose or pubescent at least along the nerves beneath, sometimes nearly glabrous with age; lateral nerves arcuate, 10-12 on either side; base rounded or narrowed; petiole stout, up to .4 in. long. *Spikes* usually paniced, terminal or axillary, in the latter case sometimes simple; panicle branches opposite, sometimes 2 together. *Flowers* 4-merous, .25-.4 in. long (excluding the stamens) each in the axil of a bracteole; bracteoles linear to linear spatulate, gradually larger downwards, .15-.4 in. long. *Calyx* densely covered with scales; limb funnel-shaped with an abruptly dilated cupular mouth. *Calyx teeth* erect, triangular. *Petals* white (dying yellow), about .1 in. long, much larger than the calyx teeth, broadly obovate, shortly clawed. *Disk* lining the free portion of calyx tube and ending in a villous ring. *Fruit* 1-1·5 in. long, 4-winged, dotted with resinous glands, densely beset on the space between the wings with linear-lanceolate scales.

N. E. FRONTIER, LAKHIMPUR, SIBSAGAR, CACHAR, KHASI HILLS up to 4,000 ft., GARO HILLS. Probably all over UPPER ASSAM.

Flrs. 4-6. Fr. 12.

**5. Combretum squamosum** Roxb. Vern. *Thlai-riel*, Lush.; *Soh-risang*, Kh.; *Setta-abung-taru*, Duff.

A large woody climber with dark brown or grey bark; softer parts covered all over with minute peltate, round,

coppery, pale or ultimately greyish white scales, more densely when young, pale to coppery. *Leaves* opposite, 4-8 by 2-4 in., usually oblong to suborbicular-elliptic or obovate to elliptic, sometimes orbicular, upper leaves smaller and narrower, short-acuminate or apiculate; coriaceous, sometimes glands disappearing with age; lateral nerves 5-7. distant; base cuneate or rounded; petiole .5-1 in. long, stout, channelled. *Spikes* paniced at the ends of branches or from upper axils, the latter often branched; panicle branches usually opposite, lower bracts leafy, upper gradually smaller; bracteoles subulate. *Flowers* 4-merous, about .3 in. long, bisexual. *Free* portion of calyx tube funnel-shaped with a cupular mouth. *Calyx* teeth triangular. *Petals* minute, spatulate, tapering to the claw, slightly longer than or the same size as the calyx teeth. *Disk* thin, lining the base of the calyx limb and ending in a fulvous woolly ring. *Fruit* 1-1.5 in. long with 4 wings covered with scales or glabrous with age; wings .3-.5 in. broad.

UPPER ASSAM, GARO HILLS, ascending to 2,500 ft. in the KHASI HILLS.

Flrs. 10-1. Fr. 4.

**6. *Combretum chinense* Roxb. Vern. *Dukha-rau-thau-di*, Cach.?**

A large woody climber, branchlets and inflorescence sparsely dotted with minute scales. *Leaves* opposite or 3 in a whorl, 2.5-5 by 1.5-2.5 in., elliptic, elliptic oblong or obovate, shortly blunt acuminate; glabrous or glabrescent and punctate on both surfaces, often with minute scales; main nerves 5-9 on either side, arched; base acute, abruptly cuneate or narrowed; petiole .2-.5 in. long, pubescent. *Spikes* axillary, 1.5-3 in. long, many flowered, pubescent; bracteoles linear, deciduous. *Flowers* 4-merous. *Calyx* dotted with scales and minutely pubescent outside; limb .25 in. long, slender at the base and then funnel-shaped. *Petals* broadly obovate, clawed, exceeding the calyx teeth. *Calyx* teeth acute, erect. *Disk* and the limb inside fulvous pubescent. *Fruit* about 1.2-1.5 in., long and 1-1.2 in. broad;



wings slightly unequal, horizontally striate, dotted with few glands.

CACHAR; Dehing river—LAKHIMPUR—Gammie, KAMRUP—Mann.

**7. Combretum dasystachyum** Kurz. Vern. *Dugrak*, Garo; *Holoklota*, Miri & Ass.; *Arkeng-ket*, Mik.; *Mei-ju-ne*, Kh.

A stout woody climber; young parts and inflorescence usually rusty hirsute or villous. *Leaves* 2·5-8 (sometimes up to 10 in. long) by 1·2-3·7 in., opposite or sometimes ternate, oblong-lanceolate to elliptic, oblanceolate or obovate from a narrowed cordate or subcordate base, acuminate, thin, somewhat rough with minute punctulate dots, glabrous above, undersurface glabrate except of hairs along the nerves axils; lateral nerves 7-10 on either side; petiole stout, short, up to ·3 in. long, glabrate or hairy. *Spikes* simple, sometimes branched, axillary, much shorter than the leaves. *Flowers* bisexual, 4-merous, about ·5 in. long; bracteoles linear, shorter than the flowers. *Calyx* densely covered outside with copper coloured or pale round scales; free portion constricted above the ovary and then funnel-shaped with the disk lining the bottom and ending in a villous ring, teeth triangular. *Petals* small, obovate-narrowed into the claw, slightly longer than the calyx teeth or about as long. *Fruit* 1-1·5 in. long, stipitate with the wings, broader than or as broad as long, shining, usually dotted with scattered glands or sometimes without glands; wings ·3-·75 in. broad.

All over UPPER ASSAM, GARO HILLS, ascending to 2,500 ft. in KHASI HILLS.

Flrs. 3-6. Fr. 12-2.

**8. Combretum extensum** Roxb. Vern. *Rekang-uphang*, Mik.

A large woody climber. *Bark* dark-brown with close but very shallow vertical furrows; branchlets glabrous. *Leaves* opposite or sub-opposite, 4-7 by 2·2-4·5 in., broadly or sub-orbicular-elliptic, elliptic-oblong or broad ovate, shortly

and often abruptly acuminate or sub-acute; base broad and abruptly narrowed on the petiole or cuneate, coriaceous, glabrous on both surfaces, somewhat rough and punctate beneath; lateral nerves 6-8 on either side, arched near the margin, upper meeting in loops; petiole .6-1 in. long, stout. *Spikes* from axils of existing or fallen leaves, simple or paniced, pubescent or puberulous. *Flowers* 4-merous, about .35-.45 in. long and .25-.3 in. across. *Ovary* downy. *Calyx* constricted above the ovary into an elongated tube and then expanded into a funnel-shaped puberulous limb. lobes acuminate, reflexed, about .1 in. long; disk lining the limb of the calyx and ending in a hairy ring at the throat. *Petals* shorter than the calyx lobes, truncate-oblong or sometimes obovate, usually notched at the apex. *Fruit* 1.25-1.5 in. long and nearly as broad (with wings); wings scariose.

SIBSAGAR—Bokajan reserve, CACHAR, Chatta-cherra, low elevations in KHASI HILLS -Thieu syryngam.

Flrs. 12-1.

*C. sundaicum* Miq. Vern. *Dukhar-rau*, *Thaudi*, Cach. Closely allied to the above and doubtful if a distinct species. *Leaves* 3-5 in., ovate or oblong, suddenly acuminate, nearly glabrous when mature, punctulate on both surfaces; petiole about .5 in. long. *Spikes* dense, paniced. *Calyx* with a ring of hairs at the base. *Fruit* as in *C. extensum*.

N. CACHAR HILLS, Langting. Sheet No. 5574—rather incomplete.

#### 4. QUISQUALIS Linn.

*Quisqualis indica* Linn. Vern. *Malati*, Beng. The Rangoon creeper.

A large scandent shrub. *Leaves* 2-4 by 1.5-2 in., elliptic-acuminate, softly pubescent at least on the beneath; petiole .2-.4 in. *Flowers* 5-merous, handsome, scented, at first white and then turning red. *Calyx* limb slender up to about 2.5 in. long; petals about .5 in. long.

A native of Eastern Burma, Malay Peninsula and Java; often cultivated as an ornamental plant.

Flrs. hot and rainy season.

## 5. CALYCOPTERIS Lamk.

**Calycopteris floribunda** Lamk.

A somewhat variable diffuse scandent shrub with drooping branches. *Bark* corky, light brownish grey, reticulately but very irregularly fissured outside, about .3 in. thick on old stems. *Branchlets* terete, rusty tomentose or glabrous. *Leaves* opposite, 2.5 by 1.2-1.5 in., elliptic to lanceolate or ovate-oblong, acute or acuminate, rusty tomentose or glabrous beneath, with minute pits containing resinous glands, thinly coriaceous, entire; lateral nerves 7-9 on either side; tertiaries reticulate; petiole .2-.3 in. long, slightly channelled, rusty tomentose. *Flowers* bisexual, .5 in. across, rusty tomentose all over in axillary and terminal panicles, crowded towards the ends of branches; bracts leaf like. *Calyx* 5, striate and produced above the ovary; limb 5 fid. .2-.3 in. long, persistent and accrescent in fruit. *Petals* 0. *Stamens* 10, unequal, 5 upper ones between the calyx lobes, remaining 5 lower down on the calyx tube and alternating with the upper stamens, all shorter than the calyx lobes. *Ovary* 1-celled, inferior; style subulate; ovules pendulous from the top of the cell. *Fruit* narrowly ellipsoid-oblong, obtusely 5-angled; limb about .15 in. deep; wings .5-.6 by .2 in., oblanceolate or obovate, membranous, 3-veined.

ASSAM—C. B. Clarke in F. B. I

There are no specimens at Calcutta from our area.

Flrs. 1-3. Fr. 2-4.

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## FAM. 57. MYRTACEÆ.

Trees or shrubs, rarely herbs. *Leaves* entire, opposite, rarely alternate (Eucalyptus), usually with an intramarginal nerve and dotted with oil glands, as are usually also young branchlet, parts of the flower and fruit; stipules 0 or minute,

deciduous. *Flowers* regular, hermaphrodite or rarely polygamous, axillary or terminal, solitary or in cymes or corymbs; bracteoles usually 2, sometimes 0. *Calyx-tube* more or less adnate to the ovary and sometimes produced above it, often with a disk lining the limb; calyx-lobes 4-5. persistent or deciduous, imbricate and often closed in bud. *Petals* as many as the lobes of the calyx, rarely 0, inserted on the margin of the disk or on the mouth of the calyx-tube, imbricate, sometimes connate and falling off as a cap. *Stamens* numerous in one or more rows within the petals, often inflexed in bud; anthers 2-celled. *Ovary* inferior or  $\frac{1}{2}$  inferior, usually 2, or 1-many celled; style simple; stigma small; ovules axile, usually numerous. *Fruit* crowned with the calyx-limb, baccate or capsular; seeds many or 1 or few by abortion, exalbuminous.

I. Leaves usually opposite; fruit baccate :—

Calyx 4-lobed; ovary 2-celled; seeds

1 or few. . . . .

Calyx 4-5 lobed; ovary usually

4-celled; seeds many. . . . .

II. Leaves (of older plants alternate); fruit capsular. . . . .

1. **Eugenia.**

2. **Decaspermum.**

3. **Eucalyptus.**

### I. EUGENIA Linn.

Trees or shrubs, evergreen or nearly so; young branchlets, leaves, parts of the flower and the fruit usually dotted with pellucid oil cavities. *Leaves* opposite, penninerved, exstipulate. *Flowers* solitary and axillary or in simple, racemed or dichotomously branched panicles. *Calyx-tube* usually articulated to the pedicel, often with two bracteoles at the base, adnate to the ovary, produced above the ovary or not, with 4-5 (rarely 5) lobes or segments or limb, subtruncate. *Petals* 4, rarely 5 or more or 0, free and spreading or united into a cap (calyptra). *Stamens* numerous in several series; filaments free or slightly combined into 4 bundles, inserted on the edge of the disk at the mouth of the calyx-tube; anthers small, versatile, often with a gland at the tip, dehiscing longitudinally. *Ovary* 2-rarely 3-celled; ovules many in each cell but only 1-few developing; style simple. *Berry* drupe-like, rarely dry and fibrous, crowned with the remains of the persistent calyx-limb; seeds 1 or few; embryo

fleshy, thick with a short radicle; cotyledons thick, free or more or less united.

The genus *Eugenia* is often broken up into several genera. As the common characters of the group are easy to recognise in the field, the old arrangement of including these plants under one genus has been adhered to. These new genera have been referred to as sections in the key.

Sect. I. JAMBOSA. *Flowers* in cymes, usually large. *Calyx-tube* produced beyond the ovary, usually with a thickened disk at the mouth and with 4 persistent rounded lobes. *Petals* free. *Stamens* bent inwards in the middle in bud. *Berry* crowned by the calyx-limb and the thickened disk; seeds large, angled :—

I. Flowers one inch or more across, showy :—

A. Petals usually 4 :—

1. Leaves rounded or cordate at the base; petioles very short :—

a. Fruit globose :—

i. Flowers pedicellate; pedicels exceeding .3 in., not stout; inflorescence lateral from axils of fallen leaves. . .

1. *E. formosa*.

ii. Flowers sessile or subsessile; pedicel when present stout; cymes usually terminal. . .

2. *E. macrocarpa*.

iii. Flowers on very short pedicels, .3 in. and less long; pedicels slender; inflorescence terminal. . .

3. *E. diospyrifolia*.

b. Fruit depressed, turbinate, flattened at both ends; cymes terminal and from upper leaf axils. . .

4. *E. aquea*.

2. Leaves narrowed at both ends :—

Leaves 3 in. and over across, elliptic or ovate; flowers pink or purple, solitary or in few flowered cymes from the axils of fallen leaves. . .

5. *E. malaccensis*.

Leaves 2 in. and under across, lanceolate or oblong lanceolate; flowers white, in raceme-like or paniced cymes. . .

6. *E. Jambos*.

B. Petals usually 12-16; leaves marrow, lanceolate, usually ternate. . .

7. *E. polypetalia*.

II. Flowers under 1 in. across :—

A. Lateral nerves of leaves usually 20 pairs or less :—

1. Petals 4 :—
  - a. Leaves not abruptly acuminate :—
    - i. Flowers sessile; calyx tube .25-.3 in. long, abruptly narrowed from a wide limb; calyx lobes minute, .1 in. or less across; berry obovoid-oblong, about .6 in. long. . . . . 8. *E. Wallichii*.
    - ii. Flowers pedicellate, calyx-tube .3-.4 in. long, clavate, turbinate, attenuated to the basal portion; calyx lobes .2 in. across; berry globose, about .5 in. long. . . . . 9. *E. Kurzii*.
    - iii. Flowers on long slender pedicels; calyx tube .5-.6 in. long, obconic, narrowed to a very slender pedicel-like basal portion, covered with conspicuous raised glands; berry about 1 in. long, ovoid or ellipsoid. . . . . 10. *E. bifaria*.
  - b. Leaves usually abruptly acuminate or shortly caudate :
    - i. Leaves over 5 in. long, thickly coriaceous; lateral nerves 13-20 pairs; inflorescence with stout branches; flowers sessile; calyx-tube broadly turbinate. . . . . 11. *E. grandis*.
    - ii. Leaves 4.5 in. and less in length, thin; lateral nerves 8-10 pairs; inflorescence branches slender; flowers pedicellate; calyx-tube obconic. . . . . 12. *E. ramosissima*.
2. Petals usually 8. . . . . 13. *E. anisopetala*.
- B. Lateral nerves of leaves numerous and parallel. . . . . 14. *E. mangifolia*

Sect. II. *Syzygium*. Flowers usually small in cymes, often corymbose. Calyx-tube produced beyond the ovary, but without a thickened staminal disk at the mouth, 4-rarely 5-lobed or sub-truncate. Petals falling off in one piece as a lid or less often free. Stamens bent inwards in the middle in the bud. Berry crowned by the calyx-limb.

- I. Petals free, usually not falling off as one piece :—
  - Lateral nerves of leaves close and sub-parallel :—

- A. Calyx-tube hemispheric, turbinate or campanulate, .2 in. or less long :—
1. Petals 4, fruit globose :—
    - a. Berry .25-.3 in. across; calyx-limb campanulate. . . . . 15. *E. cymosa.*
    - b. Berry .5 in. across; calyx-limb hemispheric, turbinate. . . . . 16. *E. saligna.*
  2. Petals 5-6, fruit ovoid. . . . . 17. *E. prætermissa.*
- B. Calyx-tube cylindrical; .5-.7 in. long; buds clavate. . . . . 18. *E. claviflora.*
- II. Petals falling off mostly in a calyptra :—
- A. Flowers mostly from axils of fallen leaves and lower leaf axils :—
1. Lateral nerves distant, 8-20 pairs :—
    - a. Tree; branchlets sharply 4-angled; panicles up to 1.5 in. long, with stout branches; calyx-tube usually with minute lobes. . . . . 19. *E. tetragona.*
    - b. Shrub; panicles up to 2.5 in. long, with slender brachiate branches; calyx-tube usually truncate. . . . . 20. *E. balsamea.*
    - c. Tree; branchlets compressed, panicles 2-6 in. long, with spreading branches; calyx-tube with distinct lobes. . . . . 21. *E. operculata*
  2. Lateral nerves of leaves numerous, slender, closely sub-parallel :—
    - a. Panicle branches not sharply angled; flowers over .25 in. across, fruit up to 1.5 in. long, oblong, usually curved. . . . . 22. *E. Jambolana.*
    - b. Panicle branches sharply 4-angled; flowers very small, under .2 in. across; fruit more or less globose not curved. . . . . 23. *E. fruticosa.*
- B. Flowers mostly terminal and axillary :—
- Lateral nerves numerous, slender and closely subparallel :—
1. Leaves 3 in. and above long :—
    - a. Flowers very small, about .25 in. across when fully formed; calyx-tube truncate or nearly so. . . . . 24. *E. khasyana.*
    - b. Flowers about .5 in. across when fully expanded; calyx-tube with distinct persistent lobes. . . . . 25. *E. oblata.*
  2. Leaves small, less than 3 in. long. 26. *E. cuneata.*

Sect. III. *Eugenia proper*. Flowers solitary, fascicled or subracemose. *Calyx-tube* not produced above the ovary, nearly globose; lobes 4, rarely 5, persistent. *Petals* 4, rarely 5, distinct. *Stamens* erect or incurved, not bent inwards at the middle in buds:—

Flowers solitary or in fascicles; young  
parts pubescent. . . . . 27. *E. bracteata*.

1. *Eugenia formosa* Wall. Vern. *Ankhi-siphak*, *Ankhi-siphasi*, *Bor-subok*, Garo; *Bamthair-angoli*, *Lohajam* (?), *Bhukua-chepā*, *Labung-garai*, Ass.; *Bomkhang-khrai*, Mech; *Mirtephong*, *Chahar-long-arong*, Mik.; *Kurak*, Daffla; *Dieng-Sa-ludong*, Synt.

A moderate or medium-sized tree, stem sometimes buttressed. *Bark* light grey, nearly smooth, green under the corky layers; blaze light brown and fibrous; branchlets more or less compressed. *Leaves* 6-15 by 2·5-6 in., shortly petioled or nearly sessile, obovate-to elliptic-oblong or oblong-lanceolate, long or bluntly short acuminate, coriaceous, glabrous, shining above, under-surface paler, midrib stout; lateral nerves 12-15, rarely more on either side, with strong intermediates in between, prominent beneath, meeting to form a wavy intramarginal nerve which is somewhat discontinuous towards the base; base usually narrowed, cordate or sub-amplexicaul. *Flowers* about 1·5 in. across, rosy pink or nearly white in corymbose cymes, usually from the axils of fallen or sometimes of existing leaves; pedicels ·3-1·5 in. long—rarely longer, slightly thickened upwards, with two minute deciduous bracteoles at the articulation with the calyx-tube. *Calyx* purplish, ·6-·9 in. long; calyx-tube broadly-turbinate, ·5-·7 in. long, abruptly narrowed to the pedicel; limb much produced; calyx lobes in unequal pairs, broader than long, ·3-·4 in. across, spreading. *Petals* free, about ·5 in. across, orbicular, shortly clawed; filaments 1-2 in. long. *Berry* globose, 1-2 in. across, white or pinkish when ripe, crowned with the persistent calyx-limb and the style; seeds rugose, greenish.

LAKHIMPUR, DARRANG, NOWGONG, KHASI HILLS, GARO HILLS—C. B. Clarke!—ascending to 4,500 ft. in the Hills.

The calyx is said to be eaten cooked. Wood hard, about 61 lbs. per c. ft.

Flrs. 3-4.



Var. *ternifolia* F. B. I. Leaves in threes, sessile or nearly so.

A form with long acuminate narrow leaves, which are sometimes only 5 by 1.5 in. with more sharply defined and continuous intramarginal nerves than in the type should perhaps be separated as a variety. This, however, passes through intermediate forms into the type. This is the commoner form in hilly country.

**2. *Eugenia macrocarpa* Roxb.** Vern. *Selua*, *Kachal-pabok*, Kuki; *Kechal-pare-bung*, Tipp.; *Shishong-phong*, Cach.; *Prandab*, Mik.

A moderate or middle-sized tree. *Bark* grey or greenish grey, nearly smooth or with shallow fissures; blaze reddish-brown, fibrous. *Leaves* 6-14 by 2.2-5.2 in., oblong-lanceolate to—elliptic or oblanceolate, shortly acuminate; coriaceous, glabrous; lateral nerves 15-25, with intermediates between, prominent beneath, joined by a somewhat wavy but continuous intramarginal nerve; base often narrowed, rounded or subcordate; petiole very short, up to .5 in. long, thick. *Cymes* subcorymbose, few flowered, terminal, rarely axillary. *Flowers* sessile or subsessile, about 2.25 in. across, pale pink; pedicel when present very short and stout, with a pair of deciduous bracteoles upto .15 in. long on the joint. *Calyx-tube* .6-1.2 in. long, turbinate, longitudinally striate in dry specimens; calyx-lobes 4, unequal, broader than long, rounded, larger pair .4-.6 in. across. *Petals* 4, free, orbicular, up to 1 in. across with a broad base. *Filaments* 1.1-1.6 in. long; style exceeding the filaments. *Berry* "about the size of an orange"—Brandis—globose, several seeded, crowned by the inflexed calyx lobes, edible.

CACHAR; N. C. HILLS; SYLHET, KHASI AND JAINTIA HILLS up to 1,000 ft., e.g., Hatmawdan; SIBSAGAR; N. E. FRONTIER; LAKHIMPUR.

The timber is considered to be hard and durable.

Flrs. 3-4. Fr. 8.

A tree (Kanjilal's Sheet No. 3254—Assam Herbarium from Rajgarhali in Lakhimpur Dist.) with large obovate coriaceous leaves apex and 12-15 somewhat distant lateral nerves on either side of midrib and oblong fruits 1.5 in. long may be an extreme form of this, unless it is a new species. The material is insufficient for ascertaining its correct position

### 3. *Eugenia diospyrifolia* Wall. Cat. 3617.

A small tree. *Leaves* 4-7 by 1·2-2·2 in., oblong-lanceolate or lanceolate, acuminate, with a cordate or sub-amplexicaul base, coriaceous, glabrous; main lateral nerves 12-14 on either side, somewhat indistinct on the upper surface uniting in a wavy intra-marginal nerve, tertiaries indistinct; petiole 0 or very short. *Flowers* white, sessile or sub-sessile, about 1 in. across, in few flowered terminal cymes; pedicels 0-3 in. long, not stout, jointed to the calyx, with 2 minute bracteoles at the joint. *Calyx-tube* ·5-·7 in. long, turbinate, much attenuated towards the base; calyx-lobes ·3-·4 in. across, orbicular. *Petals* orbicular, ·4 in. across; style exceeding the stamens, about 1 in. long. *Berry* more or less globose, 1-1·5 in. across.

Rangma reserve, SIBSAGAR, SYLHET. Wallich! KHASI HILLS, GARO HILLS.

Flrs. 8-11. Fr. 1-4.

*E. Munronii* Wight, Ic. II-14.

A middle-sized (?) handsome tree. *Leaves* 5-8·5 in., lanceolate, somewhat bluntly acuminate; base cordate, coriaceous, glabrous; main lateral nerves 12-17 on either side of midrib; pedicels short, up to ·3 in. long, stout. *Flowers* white, 1·5 in. across in terminal, usually compound cymes. *Calyx-tube* ·5-·6 in. long, obconic, attenuated to a slender pedicel upto ·3 in. long. *Fruit* globose, about ·7 in. long.

The only specimen under this name in Herb. Cal. is Burkill's 733 from Khasi Hills. This has neither flowers nor fruit and I am unable to distinguish it in this state from *E. diospyrifolia*. Hooker and Thompson's sheets are not represented in the herbarium.

### 4. *Eugenia aquea* Burm. *E. aquea* F. B. I. in part. Vern. *Dieng-soh-liwa*. Kh.; *Dieng-sa-li-dong*, Synt.

A moderate-sized tree with grey-bark; branchlets 4-angled. *Leaves* 5-12 by 1·3-2 in., oblong-lanceolate or lanceolate, acuminate; base narrowed, cordate or rounded, coriaceous, glabrous; midrib channelled above, prominent beneath; main lateral nerves 15-20 on either half, often with a few intermediates, all meeting in a prominent intramarginal nerve, ·15-·3 in. from the margin; petiole ·1-·2 in. long, stout. *Flowers* 1-1·5 in. across, greenish white ("white, red

or pale purple"—Duthie in F. B. I.), solitary or in few flowered cymes, which are terminal or from upper leaf axils; pedicels slender, .25-.4 in. long. *Calyx-tube* turbinate, attenuated to the base, .75-1 in. long; lobes unequal, broader than long, larger pair .4-.6 in. across, rounded. *Petals* 4, free, rounded, about .4 in. long. *Berry* .6-1 (?) in. across, depressed, turbinate, flattened at both ends, crowned by the calyx-lobes, 1-4 seeded.

LAKHIMPUR, KHASI HILLS, upto 4,500 ft., CACHAR—Prazer!

Flrs. 3-4, also 10— a second flush?

The Assam sheets in Calcutta Herbarium do not agree with the Burma and S. India sheets. They differ mainly by their narrower leaves, larger number of lateral nerves and fewer flowered cymes. The Burma sheets have broader—elliptic or elliptic lanceolate leaves with 8-12 pairs of distant lateral nerves and somewhat lax, corymbose, peduncled branched cymes. There is little to distinguish the Assam plant from *E. diospyrifolia*, except the larger number of lateral nerves and the shape of the fruit. Further field studies are necessary to settle if these represent two forms of the same species. In the Calcutta herbarium more than one species have apparently been included under this name. Wall. Cat. 3613 agrees with description in F. B. I. but this does not appear to be the plant illustrated in Wight's Icones t.550 and described by Roxburgh in Flora Indica and by Kurz in his Forest Flora of British Burma or referred in Wight's Illustrations ii-14.

**5. *Eugenia malaccansis* Linn. Vern. *Pani-jamuk*, Ass.; *Lal-jamrul*, Beng.**

A handsome tree with compressed branchlets. *Leaves* 6-12 by 3-4.5 in., oblanceolate, obovate-lanceolate or elliptic-oblong, short acuminate, glossy above, coriaceous; lateral nerves 10-15 on either side of midrib, all except the lowest anastomosing to form a wavy intramarginal nerve, intermediates rather indistinct; base narrowed or tapering to the short stout petiole; petiole stout, .3-.5 in. long. *Flowers* red or purple, 1-1.5 in. across, sessile or sub-sessile, solitary or in short peduncled cymes from the axils of fallen leaves. *Calyx* .5-.7 in. long; calyx-tube clavate-turbinate; base narrowed and solid; lobes rounded, unequal, broader than long, larger pair .3-.4 in. across. *Petals* free, about .5 in. long with a broad claw, nearly as broad as or broader

than long. *Stamens* about 1 in. long. *Berries* 2 in. long, obovoid or depressed, turbinate, crowned by the inflexed calyx-lobes, pink or purple when ripe.

Cultivated.

Flrs. 4-5. Fr. 5-6.

**Eugenia javanica** Lamk. Vern. *Jamrul*, Beng.

A moderate to medium-sized tree. *Leaves* 5-10 in. long, elliptic-oblong, shortly acuminate or rounded; base rounded or subcordate, thinly coriaceous, glabrous; lateral nerves prominent beneath, looped within the margins. *Flowers* 4-merous, white, about 1·5 in. across, in peduncled, compound and lax cymes, which are shorter than the leaves and terminal or lateral, often from axils of fallen leaves. *Calyx-tube* turbinate. *Berries* about 2 in. across, depressed, turbinate, crowned by the inflexed calyx-lobes, white or pinkish-white, juicy and slightly acid, flavourless.

Often cultivated for the fruits, which are considered cooling.

Flrs. 3-4. Fr. 5.

**6. Eugenia Jambos** Linn. Vern. *Golapi-jamuk*, *bangali-jamuk*, *boga-jamuk*, Ass.; *Golapjam*, Beng. The rose apple.

A medium-sized handsome evergreen tree. *Bark* grey to almost black; blaze brownish. *Leaves* 4·5-8 by 1·2 in., narrowly oblong-lanceolate to lanceolate, tapering to an acuminate apex and also at the base, coriaceous, glabrous; lateral nerves distinct beneath, 10-20 on either half, slender, often with intermediates between, joined by a prominent intramarginal nerve; petiole ·2-·4 in. long, stout, channelled. *Flowers* white, about 1·5 in. across, in few flowered terminal raceme-like cymes or sometimes panicked; pedicels upto ·4 in. long; lateral largest, with a pair of small caducous bracteoles at the top. *Calyx* turbinate, ·6 in. long; lobes sub-equal, rounded, upto ·4 in. across. *Petals* 4, free, about ·6 in. across, as broad as or broader than long. *Filaments* 1·25 in. long, subulate. *Berry* 1·2 in. across, white or yellowish when ripe, sometimes winged with pink, globose or pyriform, crowned by the inflexed calyx-lobes, delicately rose-scented, and sweet but rather dry.

Cultivated for the fruits in the plains and low elevations in most districts, sometimes found as an escape, e.g., SIBSAGAR—Gaurisagar, Bez Barua's grant; DARRANG; LAKHIMPUR—Jokai reserve.

Flrs. 2-4, sometimes a little later in hilly country. Fr. 6-7.

### 7. *Eugenia polypetala* Wight.

A small tree with grey bark; branchlets whitish, prominently marked with scars of fallen leaves. *Leaves* ternate or sometimes 4 in a whorl, nearly opposite, 3·5-6 by ·3-1 in., narrow to linear lanceolate, bluntly acuminate, sub-coriaceous, with thickened recurved margins; main lateral nerves slender, about 10-12 on either side, all except the lowest anastomosing to form the intramarginal nerve, tertiary nerves laxly reticulate; base narrowed, often attenuate to the petiole; petiole ·1-·2 in. long, stout, margined. *Inflorescence* of peduncled, few flowered corymbose cymes, 1-2 in. long or solitary from the axils of fallen leaves. *Flowers* 1-1·5 in. across, white, "scented"—Brandis; pedicels ·4-1 in. long, slender with 3 or 2 deciduous lanceolate or spatulate bracteoles, up to ·15 in. long at the top. *Calyx-tube* ·6-·8 in. long, reddish brown; limb broadly campanulate; calyx-lobes 4 or 6, rounded, broader than long, about ·4 in. across. *Petals* orbicular, free, many, usually 12-16; \* style about 1·5 in. long. *Fruit* not seen.

Rocky river banks at low elevations.

Panduah—SYLHET, Wall. Cat. 3616! KHASI HILLS—Griffith!  
Ghangail— LUSHAI HILLS, Prazer!

Flrs 3-4.

8. *Eugenia præcox* Roxb. Syn. E. Wallichii Wight.  
III. ii. 17. Ic. t. 536. Vern. *Serbai-boga-jamuk*, Ass.; *Khor-jam*, *Jam-biphang*, Cach.; *Panijam*, Cach. and Manipur; *Dieng-mirchangkh*, *Manhumi*, Kuki; *Ramui*, Tipp.

A tree attaining large dimensions under favourable conditions. *Bark* grey or pale white, outermost layers of thin papery cork, reddish-brown and fibrous inside; branchlets compressed. *Leaves* 4-10·3 by 1·5-2·5 in., oblong-

\* 4-16—Brandis.

lanceolate or lanceolate, acuminate, thinly coriaceous, under-surface brownish; lateral nerves 10-14 on either half, prominent on both surfaces—at least in dry specimens, uniting twice within the margin, outer reticulations slender, intramarginal nerve usually discontinuous towards the base; petiole .4-.5 in. long. *Cymes* usually compound, sub-corymbosely paniced, often branched from near the base or fasciculate, 1-2.5 in. long, axillary, terminal or sometimes from axils of fallen leaves. *Flowers* white, .4-.5 in. across, usually sessile or nearly so. *Calyx-tube* turbinate, .25-.3 in. long, abruptly narrowed to the pedicel like basal portion; calyx-lobes unequal, broad ovate to orbicular, up to .1 in. across. *Petals* white, rounded, about .15 in. across, free. *Stamens* up to about .5 in. long; style long, persistent. *Berry* about .6 in. long, obovoid-oblong, crowned by the incurved calyx-lobes.

Nearly all over the Province ascending to about 1,000 ft. in the KHASI HILLS.

The fruit is edible.

Flrs. 12-2. Fr. 4.

**Var. *lanceifolia*** F. B. I. Leaves narrower-lanceolate than in the type, rounded or subacute at the base; petiole .3-.4 in. long.

GARO HILLS Fisher! SYLHET—Roxburgh.

**9. *Eugenia Kurzii*** Duthie. Vern. *Girgum-dotke-asing*, Miri; *Bogi-jamuk*, Ass.; *Sel-bel*, Garo.

A moderate-sized to large tree with pale grey compressed branchlets. *Bark* brownish-grey, exfoliating in thin flakes. *Leaves* 4-8 by 1.5-3 in., lanceolate to elliptic lanceolate or oblanceolate, usually somewhat bluntly acuminate at the apex and attenuate or acute at the base, glabrous, under-surface paler, thinly coriaceous, gland dots small, pellucid; lateral nerves 8-14 on either half, slender, meeting in loops and forming a very wavy intramarginal nerve often discontinuous towards the base; petiole .5-.8 in. long. *Flowers* white, .6 in. across. *Cymes* branched or paniced, .3-2.7 in. long, solitary or fascicled in leaf-axils or axils of fallen leaves; pedicels up to .5 in. long. *Calyx-tube* .3-.4 in.

long, clavate-turbinate, attenuated to the basal portion; calyx-lobes up to .2 in. across, rounded, ultimately reflexed. *Petals* free, .2-.25 in. across; style persistent. *Berry* globose, up to .5 in. long, crowned by the spreading calyx-limb.

N. E. FRONTIER, LAKHIMPUR, SIBSAGAR, KHASI AND JAINTIA HILLS, ascending to 2500 ft., GARO HILLS, CACHAR—*Keenan*, probably also in other Districts in UPPER ASSAM.

The timber is used for tea boxes.

Flrs. 3-6.

**10. *Eugenia bifaria* Wall. Syn. *E. laurifolia* Roxb.**

A tree; all parts glabrous. *Leaves* 2-4 by 8-2 in., elliptic, sub-acute or shortly blunt acuminate, entire, membranous or chartaceous; lateral nerves slender, 8-12 on either side of the channelled midrib, meeting in two intra-marginal nerves, the first .15-.2 in. from, and the second close and parallel to, the margin; petiole about .2 in. long, channelled. *Cymes* lax, usually branched, trichotomous or corymbose, axillary or terminal, few flowered, up to 3 in. long; peduncles and pedicels slender, the latter up to .7 in. long. *Flowers* about .5 in. across, white; calyx-tube .5-.6 in. long, obconic with conspicuous raised glands, narrowed to a slender basal portion; calyx-lobes obtuse, continuous with the limb. *Petals* orbicular, prominent, gland dotted. *Berry* .8-1 in. long, ovoid or ellipsoid, yellow, crowned by the inflexed calyx-lobes.

KHASI HILLS - *Wallich*, *Brandis*.

**11. *Eugenia grandis* Wight. Vern. *Manmahui* (a name apparently used for many species of *Eugenia*) Kuki; *Moijalong*, Tipp.; *Jam*, Syl.**

A medium-sized to tall tree attaining in favourable situations 100 ft. in height and about 8 ft. in girth, sometimes with buttressed stems; branchlets terete, with close horizontal wrinkles, lenticellate; bark about .5 in. thick, greyish brown or grey, outer layers soft and peeling in thin corky-flakes; blaze reddish-brown. *Leaves* 5.5-8 by 2.7-5.7

in., broadly elliptic to ovate elliptic or suborbicular, rarely elliptic-lanceolate, abruptly short and blunt acuminate or apiculate; thickly coriaceous, shining; lateral nerves usually 12-20 on either side with conspicuous intermediate between, sub-parallel, joined by a wavy intramarginal nerve, often with another slender and rather obscure nerve near the margin; base acute, cuneate or nearly rounded; petiole .6-.8 in. long, stout. *Inflorescence* of dense corymbose stout peduncled panicles of cymes with stout branches, usually 3.5-5 in., terminal or from upper axils, often fascicled. *Flowers* white, 4-merous, sessile, about .6 in. across. *Calyx-tube* .3-.4 in. long, turbinate, abruptly narrowed to the cylindric pedicel-like base of the calyx-tube; calyx-lobes in unequal pairs, larger, about .2 in. across, whitish, broadly orbicular; petals about .25 in. long, free; filaments long. *Berry* ovoid, obovoid or nearly subglobose, 1.1-.5 in. long, crowned by the calyx-limb.

CACHAR, SYLHET, KHASI AND JAINTIA HILLS on the SYLHET slope, upto 1,000 ft.

Wood reddish brown, hard; pores joined by fine wavy concentric lines, medullary rays fine, weight about 51 lbs. per c. ft., not used.

Flrs. 12-2. Fr. 5.

## 12. *Eugenia ramosissima* Wall. Cat. 3604.

A middle-sized tree with spreading crown. *Bark* grey, nearly smooth, thin; blaze ultimately chocolate brown. *Leaves* 3.4-5 by 1.1-9 in., oblong to elliptic-lanceolate, usually more or less abruptly, but rather bluntly acuminate; lateral nerves 8-10 on either side, slender, forming intramarginal loops, tertiaries indistinct, generally more or less transverse to the midrib and sub-parallel; base abruptly or gradually narrowed to the petiole; petiole .2-.3 in. long, channelled. *Cymes* usually terminal and compound, peduncled, 1.2-5 in. long. *Flowers* .6-.7 in. across, when fully open; pedicels .2-.4 in. long. *Calyx-tube* .4-.5 in. long, narrowly obconic—gradually narrowed to a slender base, which is jointed to the pedicel; calyx-lobes .15-.2 in. across, two slightly larger, gland punctate like the petals,



which are free and .3-.4 in. across; stamens up to .7 in. long. *Fruit* not seen.

GARO HILLS, Sanitarium hill; Thlen-syringum at the foot of KHASI HILLS; EAST SYLHET, Pandua, (Wall Catalogue 3,604.)

**13. *Eugenia (Jambosa) anisopetala* Parker.** Fedde Report. Spec. Nov. XXXI (1932). Vern. *Paharejam*, Cach.

A medium-sized tree, with pale brown, glabrous, 4-angled branchlets which are shortly winged at the angles. *Bark* grey, about .25 in. thick; blaze fibrous and light brown. *Leaves* 4.5-8.25 by 2.2-7 in., oblanceolate-oblong to narrow elliptic-oblong, short-acuminate, or subacute, sometimes slightly falcate, glabrous, shining above, midnerve impressed, under-surface pale; lateral nerves usually 15-22, prominent beneath, with several irregular intermediates; intramarginal nerve .1-.2 in. from the margin, wavy; base rounded or subcordate; petiole fleshy, .15-.3 in. long. *Cymes* few-flowered in terminal and axillary panicles, which are 2.5-5 in. and often branched from near the base or fasciculate; panicle branches and peduncles angled. *Flowers* subsessile, white, about .4 in. across. *Calyx-tube* .25-.35 in. long, broad, campanulate, narrowed to a pedicel like base, about .25 in. across; calyx-lobes 4, rounded, about .1 in. long, broader than long, subsistent in fruit. *Petals* 8, free, 4 outer suborbicular, nearly .2 in. across, sparsely glandular punctate, crenulate, 4 inner slightly smaller, rather unequal. *Filaments* up to .35 in. long; style nearly .37 in. long. *Berry* .6-.8 in. diameter, subglobose, 1-2 seeded, crowned by the inflexed calyx-lobes.

CACHAR, Loharband—Owden, Das! Aijal Road! N. E. FRONTIER—Kanjilal 3,236. (If the identification of the sheet is correct.)

Fls. 11-12. Fr. 2 ripen 8?.

**14. *Eugenia mangifolia* Wall.** Catalogue 3619. Syn. *E. reticulata* Wight III.

A medium-sized tree. *Leaves* 3-5 by 1-2 in., oblong to ovate lanceolate or elliptic-oblong, gradually or suddenly

and somewhat bluntly acuminate, coriaceous, shining above: lateral nerves numerous, prominent, close with laxly reticulating tertiaries, intramarginal nerves close to the margin, slender, wavy; base usually cuneate; petiole .3-.5 in. long, channelled and margined. *Cymes* arranged in axillary and terminal usually fascicled panicles up to 2.5 in. long, often branched close to the base. *Flowers* about .6-.7 in. across when fully open (including the stamens), sessile or subsessile. *Calyx* .3-.4 in. long, broadly obconical, tapering to the solid base; limb much produced above the ovary; lobes small, ovate-acute or sub-acute. *Petals* .15 in. across, free. *Fruit* not seen.

KHASI HILLS—Hooker and Thompson; *Griffith* 2378! SYLHET—*Wall. Cat.* 3619! Mann, BRAHMAPUTRA VALLEY, Kurz! NAGA HILLS, *Prain's collector!*

Flrs. 3-4.

#### ***Eugenia inophylla* Roxb.**

A tree with straight trunk. *Leaves* 3.5 by 1.5-2.5 in., elliptic, elliptic-oblong or oblong-lanceolate, obtusely acuminate, coriaceous; lateral nerves wavy, close and subparallel, transverse to the midrib; petiole about .25 in. long. *Cymes* compound, terminal and from upper leaf axils—with stout long peduncles, arranged in spreading corymbose panicles, attaining 6 in. *Flowers* sessile, about .4 in. across. *Calyx* .25-.3 in. long, clavate-turbinate, narrowed to the solid base, obscurely 4-5 lobed. *Petals* 4-5, free. *Berries* pyriform.

SYLHET—Wallich; EAST BENGAL—*Griffith* No. 2579!

I have seen no specimen from our area at Calcutta herbarium. Differs from the preceding by its larger long peduncled panicles and more clavate calyx.

Flrs. 4-8.

#### ***Eugenia lanceolaria* Roxb.**

A small tree. *Leaves* 3.4 by 1.1-1.5 in., lanceolate or oblanceolate, bluntly acuminate; base cuneate or attenuate, coriaceous; lateral nerves slender and somewhat indistinct, 10-13 on either side of the midrib, looping to form a slender intramarginal nerve close to the margin; petiole .4-.6 in. long. *Cymes* in short corymbose panicle, terminal or from upper leaf axils; pedicels .1-2.5 in. long, thick. *Flowers* .6 in. across. *Calyx-tube* .25-.4 in. long, campanulate with a sub-hemispheric limb; base pedicel-like; lobes 4, unequal, larger pair .1-.15 in. across, broader than long, rounded. *Petals* orbicular, about .25 in. across. *Stamens* about .5 in. long; style exceeding

the stamens. *Berry* "irregularly round, lobate, size of small apple, not eaten"—Roxb. in F. B. I. *Flora Indica*.

"SYLHET" Roxburgh.

There is only sheet in Calcutta without fruit from Travancore (Bourdillon) under this name. This closely resembles some of the sheets named *E. hemispherica*. According to Roxb. the flowers are "very large, rosy and somewhat fragrant." The flowers in the Calcutta sheet are decidedly smaller than in the illustration in Wight Ic. t. 613.

Fls. 5. Fr. 12.

**15. *Eugenia cymosa* Lam. Vern. *Mui-sentel*. Tipp.; *Pani-jam*. Ass.**

A middle-sized to large tree (large shrub according to F.B.I.), old stems often buttressed at the base. *Bark* thin, greyish; blaze ultimately turning reddish-brown. *Leaves* 2·3·5 by 1·7·1·7 in., elliptic to lanceolate or ovate-lanceolate, obtusely long acuminate or caudate, cuneate or acute, coriaceous, glabrous, shining above; lateral nerves very slender, numerous, indistinct above, distinct beneath, close, subparallel, joining in a fine wavy intramarginal nerve close to the margin; petiole 2·3 in. long. *Cymes* peduncled, arranged in terminal or axillary subcorymbose panicles, with spreading branches on the axils of minute triangular bracts. *Flowers* white, small, about 25 in. across, usually sessile; bracteoles minute, resembling bracts. *Calyx-tube* 15 in. long, upper portion broad, campanulate, narrowed to the pedicel-like solid base, which is nearly as long; lobes 4, unequal, minute, broader pair rounded. *Petals* 4, small, orbicular, white, free. *Berry* 25·3 in. across, globose, crowned by the calyx-limb.

SYLHET, N. CACHAR HILLS, SIBSAGAR—Barpathar, Deroi Reserve.

The wood is used for posts, etc

Fls. 10-12.

**Var. *rostrata*.** Leaves long acuminate; lateral nerves prominent on both surfaces; petiole usually larger than in the type; calyx truncate.

CACHAR, if Assam herbarium sheet No. 10916, has been correctly named.

**16. *Eugenia saligna* (Miq.) Robinson incl. *E. acuminatissima* Kurz. *E. Cumingiana* Vedal. Vern. *Muijol-ong*. Tipp.**

A tree with brownish grey thin bark and reddish-brown blaze, all parts glabrous. *Leaves* 3-6 by 1·2-2 in. lanceolate to oblong-lanceolate, caudate-acuminate, coriaceous, shining above; lateral nerves slender, often irregularly anastomosing, intramarginal nerve close to the margin; base cuneate or attenuated to the petiole; petiole ·2-·3 in. long. *Cymes* in lax terminal and axillary, sometimes fascicled panicles up to ·3 in. long, with angular, spreading, opposite branches. *Flowers* sessile, small, ·2 in. across, white. *Calyx* ·12 in. long, hemispheric-turbinate, narrowed to a pedicel-like base; limb almost truncate at the top or with 5 very short lobes. *Petals* 5-6, free, suborbicular, about ·1 in. long; anthers didymous. *Fruit* ·5 in. across, globose, depressed at both ends, red to black when ripe, acid, deep red inside.

SYLHET—Longai reserve.

Fr. 12-1

In the Index Kewensis *E. Thumra* Roxb. has been made synonymous with *E. acuminatissima* Kurz and given precedence over the latter. I have carefully compared the sheets included under these names in Calcutta herbarium, and find that there is no justification for the combination, as they represent two very distinct species.

The name given by Kurz to the Indo-Malayan sheets is however untenable as it had been given to a Brazilian species before he adopted it. C. B. Robinson has compared the Java and Calcutta sheets named *E. acuminatissima* with the Philippine plant named *E. Cumingiana* by Vedal (1885) and with Miquels' *Jambosa saligna* (1858) and has been unable to separate them. He has therefore transferred the earliest specific name *saligna* to *Eugenia* according to International Rules of nomenclature, and has called the species *E. saligna* (Miq.) Rob. which appears to be the correct name for the plant hitherto known as *E. acuminatissima* Kurz.

I am much indebted to Mr. V. Narayanswami of the Botanical Survey of India for a critical note on the species.

**17. *Eugenia prætermisssa* Gage. Indian Forester Vol. XXXII, p. 6.**

A moderate sized tree with greyish white bark; young branches terete. *Leaves* opposite, 2·7 by 1·2-5 in., lanceo-

late, elliptic-lanceolate or sometimes oblanceolate, somewhat bluntly and often abruptly acuminate; coriaceous, glabrous, shining above; lateral nerves close, numerous, very slender, sub-parallel, intramarginal nerve slender, wavy, often with a second rather faint nerve close to the margin; base cuneate; petiole .3-.5 in. long; cymes 2-3 flowered, arranged in somewhat lax, sub-corymbose, axillary and terminal panicles up to 4.5 in. long. *Flowers* sessile or sub-sessile, .25-.3 in. across. *Calyx* about .2 in. long, broadly campanulate, narrowed to the pedicel-like basal portion. *Calyx-lobes* 4, broadly triangular, slightly inflexed, nearly .1 in. broad at the base. *Petals* 4, white, free, sub-orbicular, about .15 in. long, dotted; stamens about .3 in. long. *Fruit* about .5 by .3 in., ovoid, crowned by the calyx-limb, black when ripe.

SIBSAGAR--Jamuguri; S. LUSHAI HILLS--Gage; KHASI HILLS, Griffith. The fruit is edible.

Flrs 11-12. Fr. 4.

**18. *Eugenia claviflora* Roxb.** Vern. *Bor-srem*, *Chambu*, *Chambu* or *Sambu-sirsang*, Garo.

A small to medium-sized handsome tree with grey or brownish nearly smooth bark, all parts quite glabrous. *Leaves* 2.7-6 by .7-2 in., oblong-lanceolate to lanceolate or elliptic-oblong, acuminate, coriaceous; lateral nerves slender, numerous, intramarginal nerve slender; base acute or cuneate; petiole .2-.3 in. long. *Flowers* sessile, about .4 in. across; buds clavate. *Cymes* usually axillary or sometimes from axils of fallen leaves, compact, with short axis, often branched and fascicled; calyx-tube .5-.7 in. long, cylindrical, tapering to the pedicel-like base; limb expanded, .15-.25 in. across; lobes 4-5, very small, broad and rounded or sub-acute. *Petals* 4-5, free, about .15-.2 in. across, orbicular; stamens .6 in. long. *Berry* bluish black when ripe, .7-1.5 by .5 in., ovoid-oblong, crowned at the apex by the produced and more or less truncate calyx-limb and the incurved calyx-lobes.

GARO HILLS, KHASI HILLS—2-4,000 ft.—*Hooker and Thompson!*  
GOALPARA—Sarat-bhanga.

The fruit is said to be edible. In some forms many of the leaves are narrowly lanceolate.

Flrs. 3-4. Fr. 5.

**19. *Eugenia tetragona* Wight.** Vern. *Dieng-soh-um-kynthei*, *Dieng-soh-thiang-um*, Kh.; *Dieng-soh-sarlei*. Synt.: *Jongmi-supin-um-arong*. Cach.

A medium sized or large evergreen glabrous tree. *Bark* grey to almost black, pale brown on branches, nearly smooth; blaze brown or reddish brown; branchlets stout, quadrangular, often margined. *Leaves* 1.5-9 by 1.5-3 in., oblanceolate or oblong-lanceolate to elliptic, shortly acuminate; dark-green, coriaceous, gland dots minute; lateral nerves prominent beneath, about 15-20 on either half, with intermediates between, joined by a distinct intramarginal nerve; base cuncate or acute; petiole stout, .4-1 in. long. *Cymes* arranged in short sub-corymbose panicles up to 1.5 in. long, which are solitary or few together, from axils of fallen leaves or from lower leaf axils; panicles branches stout. *Buds* globose, about .15 in. across; flowers polygamodiarious, scented, greenish white, small, about .25 in. across, sessile; bracteoles minute. *Calyx* turbinate, about .15 in. long; tube narrowed to the somewhat stout pedicel-like base; lobes minute or obscure, deciduous in fruit lined by the thin disk. *Petals* white, .1-1.5 in. across, orbicular-obovate, broader than or as broad as long, falling off in a piece; filaments about .15 in. long; style short, none in male flowers. *Fruit* globose, about .25 in. long, red and black, crowned by the calyx-limb, 'edible'—Brandis.

KHASI AND JAINTIA HILLS, 3-5,500 ft.; CACHAR—Bhuban Hills.

A pair of deciduous acuminate bud scales are often present between the petioles of uppermost leaves.

Flrs. 7-12, according to elevation. Fr. 5.

Kanjilal's Sheet No. 4538 in Assam Herbarium from Serarim (KHASI HILLS) altitude 5,500 ft. has been referred to this species at Sibpur, but as it differs in several important characters from the plant described above it is doubtful if the sheet has been correctly named.

**20. *Eugenia balsamea* Wight.** Vern. *Thoiranguni*, *Thoiranguli*, *Joldubuli*, Ass.; *Bol-thibrong*, Garo; *Min-chal*, Lush.; *Dieng-soh-une*. Kh.

A large shrub or a small tree. *Bark* light grey—nearly white or greenish grey; branchlets whitish. *Leaves* 3·5-7 by 1·2-2·7 in., elliptic-lanceolate to obovate-lanceolate, shortly acuminate or apiculate; sub-coriaceous, glabrous; midrib and lateral nerves prominent beneath, the latter 10-12, sometimes 14 on either side, meeting in a wavy intramarginal nerve, a second somewhat indistinct nerve close to the margin; base cuneate, narrowed to the petiole; petiole 2·1 in. long. *Cymes* in sub-corymbose panicles, 8·2-5 in. long, usually from the axils of fallen leaves, rarely axillary, often fascicled; panicle branches brachiate. *Flowers* sessile, very small. *Calyx* about 1 in. long, base of calyx-tube solid, pedicel-like; limb turbinate-truncate. *Petals* 4, usually calyptrate, sometimes nearly free. *Berry* globose, about 2 in. across, red or black when ripe, crowned by the calyx-limb.

Recorded from all Districts except NOWGONG, where it also probably occurs, ascending to low elevations in KHASI HILLS.

Fls. 10-11. Fr. 3

Var. *angustifolia* F. B. I. Leaves up to 9 in. long, narrowly lanceolate or oblong-lanceolate, long acuminate, 5·1-2 in. broad; petiole much shorter than the type—up to 2 in. long.

Low elevations in KHASI HILLS, CACHAR, Prazer!

**21. *Eugenia operculata* Roxb.** Vern. *Bol-rujol*, *Thot-kak*, Garo; *Mokra-jam*, Jharua; *Godhagam*, Ass.; *Sumuk-arong*, *Thengpi-botepbhang*, Cach.

A moderate to medium-sized evergreen tree, all parts glabrous. *Bark* about 1 in. thick, pale brown or grey, rough, exfoliating in irregular hard plates; branchlets more or less compressed. *Leaves* 3-8 by 1·7-4 in., elliptic or obovate, obtusely acuminate, apiculate or rounded at the apex, glabrous, sub-coriaceous; lateral nerves 8-12 on either side, the upper joining in loops near the margin; tertiaries laxly reticulate; petiole 5·1 in. long. *Flowers* 25 in.

across, greenish-white, sessile. *Cymes* arranged in corymbose lateral panicles, 2-6 in. long, with trichotomous spreading branches from leafless nodes below the current year's shoot. *Calyx* .2 in. long, campanulate, gland dotted, limb with 4 short obtuse deciduous lobes. *Petals* white, sub-orbicular, calyptrate; connective of anthers with deciduous apical glands. *Berry* .3-5 in. long, globose or ovoid with a truncated tip.

Common in all plains forests—except in the N. E. FRONTIER.

The leaves have a pleasant aromatic smell when bruised and turn red before falling. The fruit is said to be edible. The wood is greyish red or brown, close grained; heart wood not distinct. It could be used for agricultural implements.

Flrs. 4-5. Fr. 6-7.

**Var. *Paniata*** F. B. I. Leaves acute; berries oval, larger than in the type.

SYLHET—Wallich!

**22. *Eugenia Jambolana*** Lam. E. Cumini Linn. Druce. *Sizygium Jambolanum* DC. Vern. *Jambu*, Sans.; *Jamum*, Hind.; *Kala-jam*, Beng.; *Lal-shabaj-jam*, Kur-kuri-jam, Boro-jam, Beng. (Sylh.); *Thing-seng-tel*, Ramui, Tipp.; *Khorjam*, Mech.; *Sambu*, Chambi, *Khimkhol*, *Chambu-dal-gappa*, Garo; *Kothia-jam*; *Kutai* or *Katahi-jamuk*, *Lohajam*, *Barjamuk*, Ass.; *Jambu-shi*, Cach.; *Kosoi*, Jharua; *Dieng-soh-thang-um*, *Dieng-ramai*, Kh.; *Jonkeng-asing*, Abor; *Jam-asing*, Miri; *Jangmi-arong*, *Ren-reng-arong*, Mikir.

A large evergreen tree. *Bark* rather thick, light grey or brown, somewhat rough with cracks and pits in old stem; inner substance fibrous, reddish brown; branchlets pale. *Leaves* variable in size and shape, usually 2-6-6 by 1-3-3-5 in., elliptic-oblong or ovate, acuminate, acute or sub-obtuse, narrowed—often abruptly to the base, smooth, glossy when young; lateral nerves close, very fine, meeting near the margin in an intramarginal nerve; petiole .3-1 in. long, channelled. *Flowers* greenish white, sessile, .25-5 in. across, fragrant, usually in threes in brachiate panicles of compound cymes; lateral from leafless nodes below current year's shoots or rarely axillary or terminal. *Calyx* broad-turbinate, about



.15-.2 in. long, with a truncate or very obscurely lobed limb and a pedicel-like solid basal portion. *Petals* dirty white, clayprate, suborbicular, dotted with large pellucid glands; anthers with minute apical glands. *Berry* variable in size and shape, usually up to 1 in. long—sometimes larger in cultivation—oblong or ellipsoid, often somewhat curved, black, juicy and shining when thoroughly ripe, usually crowned with the cup-like limb of the clayx-tube, purple inside, seed usually 1.

Throughout the area; often gregarious in swamps; often cultivated for fruits. In cultivation the leaves tend to become wider and larger.

The fruit is largely eaten, the juice is sometimes made into vinegar, which is considered very efficacious in dyspepsia, enlargement of spleen, etc. The seed is used in treatment of diabetes. The bark is a possible tanning material, and is also used in the preparation of astringent decoctions, gargles and washes. The wood is reddish grey, there is no distinct heartwood but the central portion is darker. It is coarse-grained, moderately hard and durable, and is specially suitable for use under water. It is used in many parts of India for buildings.

Fls. 4-5. Fr. 6-7.

**Var. *caryophyllifolia*** Duthie. Syn. *Syzigium Jambolanum* Var. *microcarpum* Thwaites. Vern. *Khude-jam*, Beng.; *Kutai-jamuk*, *Kothia jam*, Ass.; *Jamuk-arong*, Mik.; *Ramoi-thing*, Kuki.

Leaves usually lanceolate, acuminate with cuneate base, smaller and narrower than in the type; panicles shorter and sometimes irregularly branched; calyx with 4 short lobes. *Berry* roundish, size of a pepper-corn or pea. It is usually a more branchy and smaller tree.

**23. *Eugenia fruticosa*** Roxb. Vern. *Dieng-cherumi*, Synt.; *Kathiya-jamuk*, Ass.

A shrub or a low branched tree; all parts glabrous. *Bark* grey or brownish-grey with minute vertical fissures. *Leaves* 2.5-5 by 1.2-2 in., elliptic, elliptic-oblong to oblong-lanceolate or gradually acuminate; base cuneate or acute, thinly coriaceous; lateral nerves slender, numerous, sub-parallel, intramarginal nerve wavy, slender; petiole .3-.6 in. long. *Cymes* paniced; panicles up to 3.5 in. long with brachiate, usually trichotomous, sharply 4-angled branches. *Flowers* small, sessile; bracteoles minute; calyx about .1 in. long, turbinate, gradually narrowed to the base; limb

truncate or very obscurely 4-lobed. *Petals* white, calyptrate, sometimes free. *Berry* .2-.3 in. long, globose or ellipsoid.

SIBSAGAR, NOWGONG, N. CACHAR HILLS, KHASI AND JAINTIA HILLS—ascending to 3,000 ft.

Very closely resembles small fruited varieties of *E. Jambolana*.

Flrs. 3-4. Fr. 5-6.

#### 24. *Eugenia khasyana* Duthie. Vern. *Kosoi*, Jharua.

A middle-sized spreading tree; branchlets terete. *Leaves* 3-5 by .7-1.5 in., lanceolate or acuminate, attenuate or cuneate at the base, thinly coriaceous; lateral nerves numerous, slender, tertiaries laxly reticulate; petiole .25-.7 in. long, channelled. *Cymes* paniced; panicles mostly axillary or terminal, shorter than the leaves; panicle branches angular, opposite, spreading. *Flower-buds* pyriform, .15 in. long. *Flowers* about .25 in. across; pedicels 0 or very short; calyx with a short solid base, and spreading truncate or obscurely toothed limb. *Petals* 4, calyptrate, rarely free. "*Fruit* cylindric, .25 in. long, crowned by the cup-shaped limb"—Brandis.

GARO HILLS—Dalu, Northern Range; KHASI HILLS Hooker and Thompson, Griffith 2383! Thariaghat Clarke!

Fls. 10-11.

#### 25. *Eugenia oblata* Roxb. Vern. *Chhambu-akhompha*, Garo; *Mirchube*, Mik.; *Ir-mui-thing*, Kuki; *Jambu-phang*, *Jambusi-phang*, Cach.; *Dieng-sa-rumi*, Synt.

A medium-sized tree, all parts glabrous. *Bark* brownish to ashy-grey or nearly white-thin, smoothish; blaze reddish brown; branches terete; branchlets and petioles often reddish. *Leaves* 3-6 by 1.2-2.2 in., elliptic-lanceolate or oblong-lanceolate, acuminate; base cuneate or acute, coriaceous, pink when young, dark green and shining above, when mature, gland dots distinct, small; lateral nerves numerous, slender, meeting in a slender intramarginal nerve close to the margin; petiole .2-.3 in. long. *Cymes* corymbosely paniced or trichotomously compound with angular branches, up to 3.5 in. long, terminal or from upper axils.

*Flowers* white, scented, sessile or very shortly pedicelled, .5 in. across, when fully expanded; buds clavate, about .3 in. long. *Calyx-tube* .25 in. long, with a solid pedicel like narrowed base; limb expanded, free portion nearly hemispheric; lobes 4 or 5, unequal, short, persistent. *Petals* usually calyptrate; calyptra about .2 in. across; stamens white, .3-.5 in. long, connective minutely apiculate above the anthers. *Berry* .5 in. across, globose.

Recorded from all Districts except SYLHET, where it also probably occurs; extending to lower elevations in the KHASI, GARO and N. CACHAR HILLS.

Fls. 1-4.

**26. *Eugenia cuneata* Wall.** Vern. *Lari*. Sylh.; *Dieng-soh-saw*, *um-kynthei*, Kh.

A shrub or a small tree with brownish grey bark; all parts glabrous. *Leaves* 1.5-2.7 by .5-.7 in., narrowly lanceolate-oblanccolate or elliptic-lanceolate, shortly acuminate, sub-acute or obtuse; base acute or cuneate, thinly coriaceous; lateral nerves numerous, slender, sub-parallel, intramarginal nerve close to the margin, indistinct; petiole .2-.25 in. long. *Cymes* compound, sub-corymbose or trichotomous, terminal or from upper axils, upto 3.5 in. long. *Flowers* small, about .25 in. across, sessile or with very short pedicels. *Calyx* .2-.25 in. long, turbinate; limb truncate, narrowed to a pedicel like base. *Petals* calyptrate. *Berries* globose or ellipsoid, .35-.5 in. long, black when ripe, crowned by the calyx-limb.

SYLHET edges of rocky streams; KHASI HILLS, ascending to 5,500 ft.

Fls. 10-11. Fr. 12.

***Eugenia cyanophylla* Kanjilal et Das. Nov. sp.**

A shrub attaining about 12 ft. in height with grey branchlets. *Leaves* 1.5-3.5 by .3-.75 in., narrowly oblong-lanceolate or lanceolate, subacute, margins recurved, gradually tapering to the petiole, glabrous, coriaceous; secondary nerves fine, rather indistinct and comparatively distant with secondaries between intramarginal nerve close to the margins; petiole very short, about .12 in. long, channelled. *Cymes*

terminal, shortly peduncled, usually corymbose on a short axis, .4-.6 in. long. *Flowers* .6-.8 in. long, subsessile. *Hypanthium* clavate; lower portion solid; calyx-limb narrow, campanulate, .25-.3 in. long, produced above the ovary; calyx segments 5, broader than long, .05-.1 in. across, gland punctate. *Petals* 8, in two series, outer broader, .1-.12 in. by about .1 in., inner narrower and unequal, glandular. *Stamens* unequal, upto .4 in. long, smallest about .2 in. long, in several series, infolded in bud. *Ovary* 2-celled; style subulate, exerted, .53-.4 in.; ovules numerous. *Fruit* not seen.

Assam Herbarium, Sheet No. 601P and 6786. Dehing bank-elevation about (460 metres) 1,500 ft. -N. CACHAR HILLS.

The leaves dry on the upper surface a beautiful prussian blue from which it is easy to distinguish from all other *Eugenias*.

Fls. 1.

### *Eugenia grata* Wall Cat. 3585.

A small tree. *Leaves* 2.5-5 by .7-2 in., oblong-lanceolate, ovate-lanceolate or elliptic-lanceolate, acuminate, rounded or cuneate at the base, coriaceous, upper surface punctate; lateral nerves slender, 15-20 on either side, indistinct above, intramarginal nerve close to the margin; petiole .1-.25 in. long, channelled. *Inflorescence* terminal and axillary of dense clusters of cymes racemously arranged on a common axis, 1.5-4 in. long, the whole often forming a leafy panicle; peduncles of cymes 0.3 in. long. *Flowers* sessile; calyx-tube narrowly campanulate with an attenuate pedicel-like base about .3 in. long; lobes 5, very small, broad-ovate, broader than long. *Petal*, 5, orbicular, about .1 in. across, free. *Stamens* about .2 in. long; style about .3 in. long. *Fruit* ellipsoid or ovoid, .3 in. long, on a short stalk, crowned by the calyx-limb, 1 seeded.

ASSAM *Jenkins*; KHASI Mts.—*Griffith*. There are no sheets in herbarium—Calcutta from the area of the Flora.

In some of the sheets in Calcutta herbarium from Burma Shaik Mokim 343 also Curtis No. 756 from Penang, the cyme peduncles are borne in the axils of caducous spatulate or oblanceolate membranous bracts, .2 in. long and the flowers are borne in the axils of similar bracteoles, .15 in. long.

**27. *Eugenia bracteata* Roxb.** Vern. *Misi-ia-thep*, *Lukluki-jam*, Cach.; *Reng-reng-kung*, *Ingnar-arong-kong-arong*, Mik.; *Minsentel*, Tipp.; *Harch*, Nep.; *Thing-senti*, Kuki.

A small to moderate-sized tree (in our area\*). *Young* parts and inflorescence rusty or fuscous silky villous. *Bark* thin, pale-brown, almost white to light grey, finely fissured. *Leaves* 1.5-4 by .7-2 in., oblong-lanceolate to elliptic,

\* In most (*vide* Haines Botany of Bihar) parts of India it is only a shrub.

sub-rhomboid or oblanceolate, bluntly acuminate; base cuneate, thinly coriaceous, closely gland-dotted, glabrous or pubescent or puberulous along the midrib beneath, nerves faint, slender, about 10-14 on either side, intra-marginal nerve wavy; petiole about .2 in. long. *Peduncles* up to .5 in. long, 1-flowered, axillary or extra-axillary, fascicled or solitary, and often opposite, sometimes apparently terminal being crowded on new shoots with undeveloped leaves; bracteoles small, linear, deciduous, a pair at the base of the calyx. *Flowers* about .4 in. across, handsome, white. *Calyx* about .13 in. long, rusty pubescent outside, basal portion hemispheric; limb dilated; disk pubescent; calyx-lobes broadly oblong or sub-orbicular, reflexed after flowering. *Petals* about .15 in. long, orbicular, pubescent outside, margins ciliate. *Berry* .25 in. across, orange or red, globose, crowned by the persistent calyx-lobes.

N. E. FRONTIER-Dist. SIBSAGAR, NOWGONG, CACHAR, SYLHET, KHASI HILLS—near the foot on the SYLHET slopes. Probably in other Districts also. Grown in many parts of India as an ornamental plant, its myrtle like flowers adding to its beauty.

The fruit is said to be edible. The wood is reddish or purplish brown, fairly close grained and capable of taking a good polish. It is used for tool handles, posts and pestles for pounding rice.

Flrs. 1-5 according to Haines.—Flrs. and Fr. all the year round.

**Eugenia Mooniana** Wight. Vern. *Sonapati-jam*; *Muisentel*, Ass.

A small (or middle-sized?) tree; all parts glabrous. *Leaves* very variable in size and shape, 1.5-2.5 by .7-1.25 in., lanceolate, ovate or elliptic, acuminate; base cuneate or acute or rounded, thinly coriaceous, nerves inconspicuous; lateral nerves many, intramarginal nerve close to the margin; petiole .2-2.5 in. long. *Flowers* white, about .25 in. across, solitary or fasciculate; pedicels filiform, about .5 in. long, axillary or from old wood; bracteoles small, lanceolate, subulate. *Calyx* .15 in. long, pubescent outside; calyx-tube not produced beyond the ovary; lobes 4, lanceolate or oblong. *Petals* 4, longer than the calyx-lobes, free. *Fruit* .5-.7 in. long, scarlet or crimson, globose.

Sheet No. 4927 from Longai reserve in leaf only—has been referred to this species with which it agrees in foliage but more material is necessary for confirmation of the record. Our specimen attains a girth of 6 ft. but *E. Mooniana* is described as a shrub or a small tree by Brandis (Ind. Trees, p. 326); a shrub by Cooke (Flora of

the Bombay Presidency, p. 494), and a small tree by Gamble (Madras Flora, p. 484).

Fhs. 2-3.

**Eugenia aborensis** Dunn. Kew Bulletin 1920. XV., p. 109 Vern. *Pankalasing*, Abor.

A middle-sized glabrous tree, about 25 ft. high; bark whitish, fibrous, brown inside. *Leaves* sub-sessile, 5·5-9 in. by 1·2-2 in., oblong-lanceolate, acuminate, membranous, gland punctate; lateral nerves many, about 20-25 on either side, slender, prominent beneath, intramarginal nerve wavy, 1·1-2 in. from the margin with another faint one between; base narrowed, cordate and often amplexicaul. *Cymes* few flowered, terminal and axillary from axils of fallen leaves, sometimes fasciated. *Flowers* about 1·8 in. across; pedicels and calyx-tube rusty puberulous; pedicels 2·2-5 in. long, slender. *Calyx* broad, turbinate or campanulate, 3·35 in. across, rugose with raised glands, narrowed to a pedicel like base; lobes broad, ovate, 2 in. across, broader than long. *Petals* 5, rotundate, about 2·5 in. across; stamens 3·5 in. long; style about 5 in. *Immature fruit* globose, about 5 in. long, crowned by the incurved calyx-lobes.

ABOR HILLS about 2,000 ft.; N. E. FRONTIER between Pashat and Pillung.

Fhs. 12-1.

### DECASPERMUM Forst.

**Decaspermum paniculatum** Kurz. Syn. *Nelitris paniculata* Lindl. Vern. *Dieng-auro-la-pyrno*, *Dieng-la-phynia*, Synt.

A small tree with rough brown or grey bark, exfoliating in thin pieces; young parts and inflorescence covered with adpressed silvery or greyish white silky-hairs. *Leaves* 1·5-4 by 5·1 in., lanceolate, oblong-lanceolate or ovate lanceolate, cuspidate-acuminate; base gradually or abruptly narrowed to the petiole, thinly coriaceous, closely pellucid-dotted, dark glossy green above, paler and pubescent or puberulous on the midrib beneath, nerves indistinct, intramarginal nerve close to the margin; petiole 1·1-2 in. long, silky. *Flowers* white, 3·4 in. across, polygamous, in terminal and axillary panicles of cymes, about 2·5 in. long or sometimes in simple peduncled cymes; bracts leaf-like, lanceolate to subulate, upto 5 in. long, smaller upwards; bracteoles minute, linear at the top of the pedicels, which

are slender and up to .25 in. long. *Calyx* .1 in. long; calyx-tube usually densely clothed with white or greyish adpressed hairs, adnate to the ovary, limb usually 5-lobed, persistent, broadly acute, less hairy than the calyx-tube; lobes broadly ovate or sub-orbicular, broadly acute or obtuse. *Petals* white, up to .2 in. long, ciliate, gland dotted. *Stamens* numerous, in several series; filaments filiform; anthers versatile. *Ovary* usually 4-celled, inferior, with 2-ovules in each cell; style exserted; stigma peltate. *Berry* globose, about .15 in. across, crowned by the persistent calyx-lobes; seeds few, reniform; testa hard.

#### KHASI HILLS.

Figs. 7. Fl. 11.

#### EUCALYPTUS L. Herit.

Ever-green glabrous trees, sometimes attaining gigantic size, usually secreting red aromatic gum. *Leaves* gland dotted, entire, with an intramarginal nerve, in young plants opposite, horizontal, usually sessile, later on usually alternate, different in shape, petiolate, vertical, more or less falcate and coriaceous. *Flowers* bisexual, usually on axillary peduncles, in umbels or heads of 3-many or sometimes solitary; pedicels not jointed; calyx-tube turbinate or campanulate, adnate to the base of the ovary and continued beyond it, usually truncate at the apex; the orifice of the calyx-tube closed in bud, by a cap consisting of the united petals, which falls off by the pressure of growing stamens. *Stamens* numerous in many rows, infolded in bud. *Ovary* inferior, 3-6 celled; ovules numerous, axile; style undivided; stigma small. *Fruit* a hardened capsule, opening at the top by 3-6 valves; seeds numerous, minute, angular, cuneate, a large percentage sterile, these being smaller than the fertile

- |   |                             |
|---|-----------------------------|
| Calyx-tube not angled or rugose, .15 in. across,<br>not produced beyond the ovary. Flowers in<br>umbels. . . . .          | 1. <i>E. teretecornis</i> . |
| Calyx-tube angled and rugose, .6 in. across,<br>produced beyond the ovary. Flowers 1-3<br>together in leaf axils. . . . . | 2. <i>E. globulus</i> .     |

**1. Eucalyptus teretecornis** Sm. Forest red gum.

A large tree with long branches and an open crown. *Bark* smooth, ash coloured. *Leaves* 4-9 by .6-1.5 in., usually falcate, few, ovate-lanceolate, juvenile leaves ovate, coriaceous, narrowed to the stout petiole, which is .5-1.5 in. long; nerves slender, somewhat indistinct. *Umbels* 4-9 flowered, axillary, simple or paniced; common peduncle stout, .5-1 in. long; pedicels short, stout; buds about .5 in. long. *Calyx-tube* turbinate, .15 in. across; operculum conical, longer than the calyx-tube, about .3 in. long; filaments about .3 in. long; anthers opening by slits. *Capsules* about .2 in. across; valves prominently exserted.

Cultivated in Shillong, where it succeeds fairly well.

**2. Eucalyptus globulus** Labill. Blue Gum.

A lofty aromatic tree; young shoots and foliage glaucous-grey or bluish. *Bark* peeling off in long strips, which persist for a long time, exposing a smooth surface underneath. *Leaves* 6-10 by .7-1.5 in., falcate, linear to narrow-lanceolate, abruptly narrowed at the base to the rather stout petiole, punctate with black dots, nerves slender but distinct; juvenile leaves ovate, nearly sessile; petioles up to 1.5 in. long, broader upwards. *Flowers* large, 1-3 together in leaf axils; pedicels angled, very short. *Calyx tube* covered with a whitish grey bloom, warty and angular, about .5 in. long, .6-.8 in. across, rim produced beyond the ovary; operculum low, abruptly pointed, rugose. *Stamens* about .6 in. long; anthers opening by slits. *Capsules* .7-1 in. across; valves exserted.

Frequently cultivated in Shillong, where its growth is fast and attains large dimensions.

Flrs. 10. Fr. 12-1.

**Eucalyptus maculata** Hook. (Syn. *E. citriodora*). Lemon-scented gum.

A tree with bark smooth, whitish or slightly greyish. *Leaves* 4-7 in. long; lanceolate, often somewhat falcate, bright green. *Flowers* usually in 3-flowered umbels, arranged in panicles; operculum hemispheric. *Stamens* opening by slits. *Fruits* ovoid, about .5 by .4 in.



LUSHAI HILLS, cultivated. Gives a lemon scent when the leaves are bruised.

Wood strong, tough, elastic, liable to warp (Troup).

Flrs. and Fr. 1-3.

A few other species of *Eucalyptus* are also cultivated in gardens, but they are not of sufficient importance for inclusion.

**Callistemon linearis** DC. Vern. The bottle brush tree.

A small aromatic evergreen tree with rough fissured bark and drooping branches, young parts covered with soft spreading hairs. *Leaves* alternate, 1·7-3·2 by ·15-·25 in., linear-lanceolate, sharply pointed, narrowed at the base, coriaceous, glabrous with age, closely gland dotted, intramarginal nerve conspicuous; petiole very short. *Flowers* crimson, in terminal leaf bearing spikes; bracts linear. *Calyx* ·2 in. long, campanulate, hairy; lobes 5, obtuse. *Petals* 5, suborbicular; stamens numerous, long exserted, ·5-·7 in. long. *Ovary* 3-4 celled; ovules numerous. *Fruit* capsular, woody, with a truncate apex, about ·2 in. long.

Often cultivated.

Flrs. 3-12.

**Psidium Guyava** Linn. The Guava. Vern. *Sophri*, *Sophriam*, (Sylh.); *Para*, Beng.; *Madhuram*, Ass.; *Amrua*, Hind.; *Shu-khren*, Cach.; *Choupri*, Kuki; *Soh-pyriam*, Kh.

A large small evergreen or sub-deciduous tree with smooth pinkish brown bark exfoliating in thin flakes. *Leaves* opposite, 2·5-6 in. long, oblong or elliptic oblong, entire, glabrous above, pubescent beneath, faintly aromatic and pellucid dotted; lateral nerves prominent; petiole up to ·3 in. long. *Flowers* 1-1·5 in. across, white on 1-3 flowered axillary peduncles; calyx urceolate, lower portion adnate to the ovary, upper portion free and irregularly lobed. *Petals* free. *Berry* globose or pyriform, varying in size and shape, ordinarily about 2·5 in. in length, containing numerous seeds, immersed in a pleasantly flavoured sweet pulp.

Largely grown in gardens, sometimes found as an escape.

Flrs. and Fr. almost throughout the year but flrs. mainly hot season and fr. rainy and cold season.

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## FAM. 58. LECYTHIDACEÆ.

Trees. *Leaves* alternate, usually crowded at the ends of branchlets, exstipulate, entire or shortly toothed, without oil glands. *Flowers* solitary, in racemes or spikes, hermaphrodite. *Calyx-tube* adnate to the ovary; lobes 4-6, rarely 2-3, valvate or imbricate. *Petals* 4-6, rarely 0 or more. *Stamens* many, in several series; filaments more or less connate at the base, and sometimes arranged on one side of the flower; anthers sometimes wanting or some of the stamens modified to staminodes. *Ovary* inferior, 2-6, rarely more celled, usually many ovuled; style long, slender; stigma capitate. *Fruit* a woody fleshy or fibrous berry with 1-many seeds; seed exalbuminous.

Flowers in short spikes. Fruit globose, many-seeded; stamens some without anthers. . . . . 1. **Careya.**  
 Flowers in pendulous racemes. Fruit angular. 1-seeded; stamens all perfect . . . . . 2. **Barringtonia.**

### 1. CAREYA Roxb.

**Careya arborea** Roxb. Vern. *Kumbhi*. Sans.; *Kumbhi*, Beng., Hin. and Ass.; *Waiduphang*, *Bon-appi*, *Bon-iaphi*, Cach.; *Loring*, Mik.; *Khum*, Mech; *Soh-kyndur*, *Ka-mahir*, Kh.; *Panibhela*, (Darrang), *Godhajam*, *Kum*, *Kumrenga*, *Kumari*, Ass.; *Gambel*, *Bol-dimbel*, Garo; *Thing-poi*, Kuki, *Bhola-changne*; Daff.

A moderate to medium-sized deciduous tree. *Bark* dark grey or brown, thick, fibrous, exfoliating in narrow flakes, brownish-red inside. *Leaves* alternate, 6-12 by 3-7 in., obovate or oblanceolate, shortly acuminate or obtuse; base narrowed to a short margined petiole, crenulate-denticulate, glabrous, thin; lateral nerves 10-15, looping near the margins. *Flowers* 2·5-4 in. across, with an unpleasant smell, white and pink in few flowered stiff terminal spikes; bracts 3, unequal, central elliptic, 2 lateral linear. *Calyx* about 1 in. long; calyx-tube campanulate, not produced beyond the ovary; lobes 4, a little shorter than the tube, rounded, stiff. *Petals* 4, white, caducous,

about 2 in. long, imbricate, elliptic. *Stamens* numerous in several series; filaments up to 3 in. long; gradually longer outwards, those of the innermost and outermost series without anthers. *Ovary* inferior, usually 4-celled with an annular disk at the top; ovules numerous, in 2 series on axile placentæ; style long, stiff. *Berry* 2·5-3 in. across, globose or ovoid, crowned with the limb of the calyx-tube; seeds numerous, up to 1 in. long, immersed in pulp.

SYLHET, CACHAR, GOALPARA, GARO HILLS, NOWGONG, DARRANG, KHASI HILLS up to about 2,500 ft.

Sapwood large, whitish, heartwood reddish, even grained, medullary rays fine, numerous, uniform. The timber is durable, stands well under water and takes a good polish. It is mainly used for oars and tool handles in this province, weight about 50 lbs. per c. ft. It could be used for planking, cart furniture and cabinet work. The bark, flowers, juice and fruit are considered medicinal.

Flrs. 4-5. Fr. 7. Leaves turn red or purple before falling.

## 2. *BARRINGTONIA* Forst.

***Barringtonia acutangula*** Gärtn. Vern. *Ijul*, Sans.; *Hinsol*, Sylh. & Ass.; *Hijal*, Sylh.; *Hinyol*, *Pani-amra Bheh*, Ass.; *Chin-chong-arong*, Mik.

A small to medium-sized tree. *Bark* dark grey to almost black, longitudinal, but reticulate furrowed, 1/5-1 in. thick, inner substance light pinkish, soft. *Leaves* 3-6 by 1·3 to 3·3 in., alternate, crowded at the ends or branches, obovate or oblanceolate, apex rounded or subacute, minutely denticulate, thinly coriaceous, glabrous; lateral nerves distinct, 8-13 on either half, curved near the margin; tertiaries reticulate; base narrowed; petiole up to 1/25 in. long, margined. *Flowers* about 1/5 in. across, deep red, delicately fragrant, in slender, drooping, glabrous racemes 6-18 in. long. *Pedicels* 1/15 in. long; bracts oblong; bracteoles lanceolate, both caducous. *Calyx-tube* funnel-shaped, not produced beyond the ovary; lobes 4, rounded, equalling the tube, minutely denticulate. *Petals* 4, about 1/2 in. long, adnate to the base of the staminal tube, imbricate, falling off early along with the stamens in one piece. *Stamens* in several series, red, connate below; filaments dilated at the base. Disk annular, epigynous, within the staminal tube. *Ovary* inferior, 2-celled, with 2 pendulous ovules in each cell; style filiform.

*Fruit* about 1·5 in. long, oblong, bluntly quadrangular, crowned with the persistent calyx lobes, somewhat narrowed and truncate at both ends. fibrous, 1-seeded.

Throughout ASSAM ascending to 2,500 ft., usually on banks of streams, edges of swamps, and moist places.

Wood pale or reddish brown, soft, medullary rays broad and very broad, numerous, no distinct heartwood—but fairly tough and durable. It is considered suitable for cabinet making, boat building, wells, carts, etc. Wt.—about 40 lbs. per c. ft.

The bark is used for intoxicating fish.

The cotyledons are rudimentary and the embryo and seedlings have swollen hypocotyl.

Fls. 3-6. Fr. 9-10. Flowering and fruiting also in the cold weather—R. N. De.

**Couroupita guianensis** Aubl. The cannon ball tree.

A tree with pubescent young parts. *Leaves* 6-9·5 by 2·2-3·2 in., oblanceolate or obovate-lanceolate, shortly acuminate, thin, glabrescent above, thinly pubescent beneath; lateral nerves 18-20 on either side, looped near the margin. *Flowers* large, showy, pinkish, about 3·5-5 in. across, from old wood. *Calyx* lobes rounded. *Petals* 6, obovate subequal, 1·5-2 in. long, connate at the base with the staminal tube. *Fertile* stamens borne on an outgrowth of the tube, which is bent over the staminode bearing tube; filaments of fertile flowers dilated, up to ¼ in. long. *Fruit* large, woody, globose (whence the English name) with an extremely unpleasant smell when ripe.

Cultivated, e.g., Gauhati.

The timber is said to be good.

Fls. 7. Fr. 1-2.

## FAM. 59. MELASTOMACEÆ.

Herbs or shrubs, rarely trees or climbers. *Leaves* exstipulate, opposite or whorled, generally petioled, entire or nearly so, often 3-7 nerved from or from near the base, which approximate near the apex, rarely penninerved (*Memecylon*). *Inflorescence* various. *Flowers* regular, hermaphrodite, often showy. *Calyx-tube* tubular or campanulate, partially (often by septa like vertical walls) or entirely adnate to the ovary and more or less prolonged beyond it, rarely free; limb

usually 4-5 (rarely 3 or 6) lobed, sometimes truncate, rarely falling off as a cap. *Petals* as many as calyx lobes, contorted in bud. *Stamens* as many to twice as many as the petals, and inserted with them on the edge of the calyx-tube; alternate stamens sometimes shorter, sometimes rudimentary; filaments inflexed in bud, often geniculate; anthers 2-celled, usually opening by pores, rarely by longitudinal slits; connective often appendaged at the base. *Ovary* usually 4-5, sometimes 3-6 celled (1 celled in *Memecylon*); style simple, filiform, rarely short; ovules many (except in *Memecylon*); placenta usually axile (free central in *Memecylon*). *Fruit* included in the calyx-tube, baccate or capsular, breaking up irregularly or by pores through the top of the cells. *Seeds* minute, many (1 in *Memecylon*), albumen 0.

- I. Leaves with 3 or more prominent basal nerves; ovary 4-5 celled; seeds numerous :—

A. *Petals* 4-5 :—

1. *Stamens* twice as many as petals :—

- a. Apical portion of ovary bristly harshly hairy or scaly; seeds curved through half a circle :—

*Stamens* equal; capsule opening at the apex by pores. . .

*Stamens* unequal; fruit bursting irregularly. . .

- b. Apical portion of ovary glabrous; seeds more or less straight or sub-falcate :—

- i. *Fruit* capsular :—

*Stamens* unequal; fruit 8-ribbed. . .

- ii. *Fruit* baccate :—

*Stamens* equal. . .

*Stamens* unequal. . .

2. *Stamens* as many as petals; fls. small. . .

- B. *Petals* 3. *Stamens* equal. . .

- II. Leaves penninerved without prominent basal nerves; ovary 1-celled, few ovuled; seed usually 1. . .

1. **Osbeckia.**
2. **Melastoma.**
3. **Oxyspora.**
4. **Medinilla.**
5. **Anplectrum.**
6. **Blastus.**  
**Sonerila.**
7. **Memecylon.**

1. OSBECKIA Linn.

Hairy herbs or shrubs, commonly with 4 angled branchlets. *Leaves* opposite or ternate. *Flowers* 4-5 merous,

terminal in capitate cymes or in panicles, sometimes solitary. *Calyx-tube* with stellate hairs or pectinate scales outside, adnate to the lower half of the ovary; segments and usually part of the limb deciduous. *Stamens* 8-10, equal or unequal, anthers oblong, which may be more or less beaked, connective not produced at the base, slightly swollen or with 2 tubercles. *Ovary* 4-5 celled, setose at the apex; ovules numerous on the placenta radiating from the axis. *Capsule* opening by 4-5 pores from the free top. *Seeds* numerous, curved through half a circle, pitted.

I. Flowers 4 merous :—

A. Flowers panicled; shrubs 3-5 ft.:-

Calyx-tube with dense tufts of stellate hairs, much branched shrubs. . .

1. *O. crinita*.

Calyx-tube glabrous or with few hairs usually stem undivided. . .

2. *O. rostrata*.

B. Flowers capitate; perennial herbs or undershrubs up to 2 ft high:

Erect, leaves linear oblong-lanceolate; bracts glabrous or nearly so. . .

3. *O. chinensis*.

Diffuse branching from near the base; leaves broad ovate, adpressed pubescent. . .

*O. capitata*.

II. Flowers 5 merous :—

4-5 ft. high. Flowers usually white, not nodding, in compound cymes; calyx with bristle fringed scales. . .

4. *O. nepalensis*.

Leaves over .5 in. broad. . .

2-3 ft. high. Flowers usually mauve, nodding solitary or few together; calyx glabrous or nearly so; leaves under

.5 in. broad, linear or narrow lanceolate. . .

5. *O. nutans*.

**1. *Osbeckia crinita* Benth. Vern. *Ja-lang-kthem*. *Dieng-soh-kthem*. Khasi.**

A small much branched shrub ordinarily attaining about 5 ft., but sometimes taller; branches covered with spreading bulb based fuscous hairs. *Leaves* 2-4 by .9-1.5 in., ovate to oblong-lanceolate, acuminate, rounded to subcordate, sometimes narrowed at the base, clothed on both surfaces with harsh adpressed hairs, 5-7 nerved; tertiaries fine, sub-parallel; petiole .2-.5 in. long. *Flowers* purple (according to C. B.

Clarke—sometimes pure white), about 1.25 in. across, 4 (rarely 5) merous, in corymbs of cymes; pedicels up to .25 in. long; bracts ovate or suborbicular, densely hairy on the back or sometimes glabrate with a dense fringe of hairs along the margin. *Calyx* .4 in. long with stiff stellate hairs; sometimes borne on minute, linear scales. upper portion of limb deciduous along with petals and stamens, a truncate fruiting calyx persisting; lobes subulate, usually alternating with linear scales, often pectinate with bristles and crowned by stellate bristles. *Petals* obovate, about .6 in. long; stamens 8; anthers large, produced into long incurved beaks; base of the connective tubercled. *Bristles* on the apex of the ovary 18-20. *Fruit* including the neck .5 in. (.75 in. according to F.B.I.) long, suddenly narrowed to a neck; fruiting calyx ultimately hairless, free portion about equalling, narrower than the fruit.

KHASI HILLS 4-6,000 ft.

Fls. 7-10. Fr. 11-1

*Osbeckia septeminervia* Ham. in notes of the Royal Botanic Garden Edin. Vol. X (1917), p. 55.

Branchlets quadrangular, hirsute with spreading hairs. *Leaves* 3-5 by .8-1.3 in., lanceolate to oblong-lanceolate, gradually attenuated to the acute apex, chartaceous, thinly adpressed hirsute above, pale and with long hairs on the nerves; base 7 nerved; petiole 3-.45 in. long, densely hairy. *Cymes* axillary or terminal and paniced, densely covered with harsh hairs; bracts sub-rotundate to ovate, often acuminate, .25-.35 in. long, dorsally adpressed setose, glabrous within, margin long ciliate. *Calyx* segments 4, linear-lanceolate, subacuminate or long acuminate, .5-.6 in. long, sparsely clothed with long setose and whitish adpressed short hairs, margins setose-ciliate; hairs never glandular. *Petals* 4, about 1 in. by .8 in., obovate to orbicular-ovate, more or less shortly clawed, ciliate. *Stamens* up to 1.5 in. long; anthers slightly longer than filaments. *Ovary* included; style up to 1.2 in. long.

Allied to *O. crinita* from which it differs mainly by its large flowers.

GOALPARA—Hamilton.

## 2. *Osbeckia rostrata* Don. Vern. *Phutki*, Assamese.

An erect almost unbranched shrub attaining 5 ft.; stem herbaceous, nearly glabrous or with scattered bristly ascending hairs. *Leaves* opposite or sometimes ternate, 3-8

by 1.2-5 in., lanceolate to ovate-lanceolate or elliptic-oblong, acuminate, subcordate, rounded or narrowed at the base; thin, almost glabrous to strigose, specially along the nerves, basal nerves 5, sometimes 7; petiole .12-.6 in. long. *Flowers* about 1.5 in. across, 4 merous, rose purple, in long paniced cymes; pedicels quadrangular, 0.1 in.; bracts .25 in. long, ovate-ciliate, glabrous or hairy along the nerves on the back. *Calyx* .6-.8 in. long, glabrous or with scattered bristles or rarely stellate hairs; lobes .25-.4 in. long, lanceolate or elliptic-lanceolate, ciliate, alternating with subulate, usually bristle pectinate processes and deciduous along with the rim of the calyx-limb. *Petals* .6-.8 in. long, usually more or less ciliate. *Anthers* 8 with long incurved beaks; base of the connective tubercled. *Ovary* without or with short bristles at the top. *Fruits* .5-.8 in. long, narrowed into a long cylindric neck. *Fruiting calyx* glabrous or nearly so, rarely with scattered stellate hairs; free portion of calyx as long as or longer and narrowed than the fruit, truncate at the apex. Very variable as regards hairiness.

In swampy ground all over the province ascending to 4,500 ft. in the KHASI HILLS.

Flrs. 7-9. Fr. 10-12.

**Var. *pulchella*** Benth. Stem glabrous, 4-angled. *Leaves* lanceolate or ovate lanceolate, glabrous or slightly strigose on the nerves specially on the outermost; petioles long, scales between the calyx lobes glabrous, obscure or absent. *Fruits* large, .7-.8 in. long; seeds buff.

GOALPARA; Mamloo-K. & J. HILLS probably all over the Province.

### 3. *Osbeckia chinensis* Linn.

A weak erect undershrub attaining up to 2 ft. in height, branches pubescent with ascending adpressed hairs. *Leaves* 1-2 in. by .2-.5 in., oblong to linear-lanceolate; base narrowed, 3-5 nerved, adpressed pubescent on both surfaces; petiole 0 to very short. *Flowers* capitate at the ends of the branches, mauve or purple, 1 in. across, 4-merous; bracts .2-.25 in. long, elliptic or ovate ciliate, glabrous on the back. *Calyx* .5 in. long. *Calyx-tube* glabrous; lobes lanceolate, ciliate, alternating with scales tipped with long spreading bristles, deciduous with the rim of the limb.



*Petals* about .5 in. long. *Stamens* 8; anthers long beaked; ovary with about 16 erect bristles at the top. *Fruit* about .25 in. long; fruiting calyx .2 in. across with a short neck, glabrous.

Common specially on the hills ascending to 5,000 ft. in the KHASI HILLS.

Flrs. 7-11.

***Osbeckia capitata* Benth. Vern. *Soh-pythem*, Khasi.**

A perennial herb attaining about 20 in. in length, branches from near the base; branches weak, 4 angled, strigose with ascending adpressed bulb-based bristly hairs. *Leaves* .5-1 by .3-.5 in., subsessile, ovate to elliptic ovate, with a broad or subcordate, 3-5 nerved; (up to 9 nerved according to F.B.I.), base adpressed pubescent on both surfaces. *Flowers* .8-1 in. across, pinkish purple, capitate on the ends of branches, sometimes on short peduncles from upper axils. *Bracts* .2-.25 in. long, ovate, acute, adpressed pubescent, ciliate. *Calyx* .5 in. long, glabrous; lobes lanceolate, ciliate, alternating with minute bristle fringed scales, deciduous along with the rim of the limb. *Petals* about .5 in. long with a few cilia at the apex; anthers with a long beak. *Ovary* with 16-20 bristles at the apex. *Fruit* .3 in. long, .2 in. across with a short neck. *Fruiting calyx* glabrous.

KHASI HILLS 4,000 6,000 ft. Very common in forest undergrowth and in grass.

Flrs. 6-10. Fr. 11.

**4. *Osbeckia nepalensis* Hk. f.**

A small shrub attaining about 5 ft. in height with sharply 4 angular, sometimes shortly winged stem and branches, covered with adpressed ascending stiff hairs. *Leaves* 2.5-5.5 by .7-1.7 in., oblong-lanceolate to lanceolate, broadly acute to shortly acuminate; base broadly cordate to rounded, 5 nerved, pubescent on both surfaces with rather harsh hairs; petiole very short upto .1 in. long. *Flowers* white (or mauve according to C. B. Clarke), 5 merous, about 1.5 in. across in compound corymbose cymes, terminal and sometimes from upper axils; cymes compact; pedicels upto .1 in. long, stout; bracts .5 in. long, ovate or elliptic,

scarious, ciliate along the margins, villous along the centre of the back and the base glabrous elsewhere. *Calyx* with persistent scales fringed with bristles, of which 5 alternate with the lobes; rim of the calyx-tube deciduous; lobes .4 in. long, broadly lanceolate, glabrous, ciliate along the margins. *Petals* about .7 in. long, broadly obovate, usually with a few cilia at the apex. *Stamens* 10; filaments dilated in the middle; apex constricted and crowned by a rim formed by the dilated base of the connective, anthers attenuated to a pointed tip (not beaked). *Free portion* of the ovary strigose and with a ring of bristles on the 5 crenate crown. *Fruit* about .5 by .3 in., free portion of fruiting calyx very short; apex of the capsule slightly protruding beyond the rim.

Almost all over ASSAM, ascending to 4,500 ft. in the KHASI HILLS.

Flrs. mainly 4-11.

### 5. *Osbeckia nutans* Wall.

A small much branched shrub about 2-3 ft. high with wiry, strigose branches. *Leaves* 2-2 by .15-.45 in., narrow or linear-lanceolate, 3 nerved, very prettily lineolate along nervules above (when dry), and glabrous and pale or sometimes golden yellow beneath between the strigose main nerves and margins. *Flowers* usually 5-merous, sometimes 4-merous (Kanjilal's Sheet No. 7450 in Assam Herbarium), rose purple, about 1 in. across, 1-3 together on short terminal and axillary peduncles; pedicels strigose, nodding up to with a line of adpressed bristles along the centre of the back, otherwise glabrous. *Calyx* .5 in. long, glabrous or with few caducous bristles; lobes lanceolate, .3 in. long, ciliate and with minute bristle-fringed scales in between, deciduous along with the rim of the calyx-limb. *Petals* .4-.5 in. long, with few cilia at the apex. *Stamens* twice as many as the petals; filaments dilated in the middle, connective ending in a rim; anthers attenuate. *Free part* of the ovary persistently strigose. *Fruit* .2 in. long, about .2 in. across, top extruded from the hemispheric fruiting calyx.

GOALPARA, probably extending along the Sub-Himalayan Tracts to DARRANG and KAMRUP.

Flrs. 10-12. Fr. 11-1.

## 2. MELASTOMA Linn.

Strigose or villous shrubs. *Leaves* 3-7 nerved. *Flowers* 5 (rarely 6-7 merous). *Calyx-tube* with simple hairs or scales; lobes deciduous. *Stamens* twice as many as the petals, alternate ones long with purple anthers and connective produced at base and terminating in two lobes, the remaining shorter ones with yellow anthers, connective not produced but with two tubercles in front. *Ovary* as in *Osebeckia*. *Fruit* coriaceous or somewhat baccate, bursting irregularly. *Seeds* numerous, curved through half a circle, minutely punctate.

Young parts rather rough; stem adpressed scaly, not shaggy, upper surface of leaves thinly pubescent with hairs adpressed for their entire lengths; buds usually completely enclosed within the bracts; calyx lobes glabrous inside. . . . .

1. *M. malabathricum*.

Young parts silky; stems shaggy, upper surface of leaves more or less densely adpressed pubescent; hairs free at one end; bracts usually not enclosing the buds; calyx lobes generally more or less hairy

2. *M. normale*.

1. *Melastoma malabathricum* Linn. Vern. *Khakkhi*, *Khakku*. *Bol-khakhu*, *Khakhuchi*, Garo; *Tokle-gach*, Jharua; *Phutuka*, *Phutkala*, *Phutki*, A-s.; *Khusemphan*, Kach., *Bit-bit-arong*, Mik.; *Leidum*, *Mulkong*, Kuki; *Murkong*, Tipp.; *Syntew-soh-pydang*, *Ka-dieng-kum*, *Dieng-soh-khing*, Kh.; *Phutuli*, Syll.; *Thung-khu*, Moch.

A handsome bushy shrub attaining up to 15 ft. in height; young parts densely adpressed bristly; stem and petioles strigose with long and subulate to short echinate scales. *Leaves* 2.5-5 by .7-2 in., oblong-lanceolate, lanceolate or elliptic, acuminate, scabrous with hairs adpressed for their entire lengths above, undersurface scaly strigose on main nerves and harshly adpressed pubescent or bristly on the tertiary nerves and on the space between basal nerves 3-5; petiole .2-1 in. long, scaly strigose. *Flowers* mauve-purple, 1.5-3 in. across, usually in clusters of 1-5 at the ends of branchlets; bracts .4-.75 in. long, enclosing the buds, elliptic or obovate, obtuse or acute, narrowed into a broad stalk, adpressed scaly outside; pedicels up to .3 in. long, stout,

clothed with serrulate scales. *Calyx* .6-.75 in. long. *Calyx-tube* densely covered with pale brown, linear acuminate, and usually serrulate scales; calyx-lobes lanceolate, .25-.35 in. long, deciduous, thinly pilose outside, glabrous with a few hairs towards the apex within. *Petals* .7-1.25 in. long. *Fruit* about .25 in. across, truncate, rather pulpy inside with fleshy purple placenta and breaking up transversely outside.

Throughout the area ascending to 5,000 ft. in the KHASI HILLS. Sometimes gregarious in waste lands.

The fruits are eaten and the leaves are applied over cuts to stop bleeding.

Flrs. 2-7. Fr. 11-12 probably all the year round

**2. *Melastoma normale*** Don Vern. *Ja-long-kythem-heh*, *Dieng-slidong*, *Dieng-soh-klong*, Khasi.

An erect shrub attaining about 15 ft. in height; branches densely shaggy with spreading hairs, usually with subulate bristles at the nodes; young shoots fuscous, silky villous. *Leaves* 2.5-5 by 1-2 in., oblong-lanceolate to ovate-lanceolate, shortly acuminate or acute; base 3-7 nerved, pubescent above with long adpressed hairs, free at one end, undersurface pubescent or villous, midrib and often the main nerves with subulate serrulate scales; petiole .25-.8 in. long, with bristly hairs and scales. *Flowers* rose purple, about 2 in. across, 3-10 together in terminal clusters, sometimes a few from upper axils; pedicels up to .4 in. long, densely clothed with adpressed acuminate serrulate scales like the calyx; bracts caducous, ovate acuminate to linear-lanceolate, up to .5 in. long, not enclosing the buds, villous outside. *Calyx* .5-.75 in. long; lobes .2-.3 in. long, less densely pubescent than the calyx-tube outside, more or less pubescent inside. *Fruit* as in the last species.

Difficult to distinctly distinguish from the last species of which it is no. improbably a variety. It is more softly pubescent and generally more hairy than the last species but I have seen forms intermediate in hairiness between the two species.

KHASI HILLS 2-5,000 ft.

Flrs. and Fr. most of the year, mainly 5-1.

**Melastoma imbricatum** Wall Cat. Branches, petiole, peduncles and calyx covered with adpressed serrulate scales. *Leaves* 4-9 in. long, broad elliptic, strigose on both surfaces; nerves on the undersurface with adpressed scales. *Flowers* in terminal clusters, about 1-25 in. across. *Fruit* 3-6 in. long, ovoid, the margin at the top somewhat dilated.

ASSAM, KHASI HILLS Brandis. I have seen no specimens of the species from our area.

**Pleroma macaranthum** D. Don. A shrub or a small tree; branchlets, petiole and axis of inflorescence clothed with soft spreading hairs; young parts silky, villous. *Leaves* 3-5 by 1-2-2-2 in., elliptic to lanceolate-acuminate or acute, 5-7 nerved, softly hairy on both surfaces, more densely beneath; petioles 3-5 in. long. *Flowers* 3-3-5 in. across, purplish-blue, very showy, sessile or nearly so in compound cymes from ends of branches or upper leaf axils; bracts about 1 in. long, somewhat harshly pubescent outside, red with age enclosing the buds, caducous. *Calyx* adpressed pubescent; calyx-tube .5 in. long; lobes 5, oblong-lanceolate, as long as the tube or slightly longer, deciduous, glabrous inside, often bordered with red on the margins. *Petals* 5, broadly obovate, about 1-5 in. long. *Stamens* 10, 5 long and 5 short; filaments declinate, glandular hairy except at the top; anthers bluish purple, narrowed at apex, connective produced at the base, 2-tubercled. *Ovary* 5 celled; ovules numerous on radiating placentæ.

A native of Tropical America. Cultivated in Shillong, where apparently the fruit does not ripen. Very handsome striking when in flower.

Flrs. 7-11.

### 3. OXYSPORA DC.

Large spreading shrubs with drooping branches. *Leaves* long petioled, large, 5-7 nerved, secondary nerves parallel. *Flowers* in long terminal panicles with decussate branches; bracts very small. *Calyx-tube* cylindric, turbinate; teeth 4, short, triangular. *Petals* 4, sub-acute. *Stamens* 8, 4 with long filaments and purple, the others yellow; anthers narrowed upwards, opening by single apical pore. *Ovary* inferior, 4-celled; apex glabrous; style simple, elongate; ovules numerous on radiating axile placentæ. *Capsule* fusiform, dry, 8 ribbed. *Seeds* numerous, minute, often falcate.

- I. Not glabrous; connectives of shorter anthers at least spurred:—

Young parts with spreading hairs,  
larger anthers shortly lobed, connec-  
tives of all spurred. . . . .

1. *O. vagans*.

Young parts tomentose with fugacious stellate scurf, also with soft deciduous bristles; larger anthers deeply lobed, connective of shorter anthers spurred; of larger anthers with minute protuberance. . . . . 2. *O. paniculata*.

11. All parts glabrous, connective of anthers not spurred. . . . . 3. *O. cernua*.

**1. *Oxyspora vagans* Wall.** Vern. *Sinka-asing, Jogur-migjir*. Abor; *Dieng-soh-ladoukhlaw*, Synt.; *Tew-soh-kthem*. Kh.

A moderate-sized shrub attaining about 4 ft. in height: branchlets, petioles, undersurface of leaves along the nerves clothed with spreading hairs. *Leaves* 3·5-7 by 1·7-3·7 in., those near the panicle very small, elliptic or ovate-lanceolate to suborbicular ovate or acuminate; base subcordate, 5-7 nerved, entire or shortly dentate, membranous, more or less ciliate along the margins, otherwise glabrate above; petioles up to 3 in. long, shorter upwards. *Panicles* stellate pubescent, branches ending in cymes. *Flowers* purplish red; pedicels short, slender; bracts up to .2 in. long, linear-lanceolate or spatulate. *Calyx* .25 in. long, stellate pubescent with a constricted neck; teeth acute, distant. *Petals* .25 in. long, shortly acuminate. *Base* of longer anthers shortly 2 lobed, connectives spurred. *Capsule* about .3 in. long, narrowed and produced to the base, crowned by the enlarged limb of the calyx-tube. *Seeds* minute, truncate at the apex, falcate or sub-falcate with two sharp-points bent at right angles in front and back, the former usually shorter, dark-coloured and continuous with a lateral ridge-(raphe).

N. E. FRONTIER, SIBSAGAR, KHASI HILLS up to 3,500 ft.  
Fls. 10-11. Fr. 2

**2. *Oxyspora paniculata* DC.** Vern. *Lang-tang*, Khasi.

A shrub attaining 8 ft. in height; young shoots and petioles with dense fugacious, stellate scurf and soft spreading bristles, undersurface of leaves, inflorescence and calyx outside, thinly stellate, scurfy. *Leaves* 5-9 by 2·5-6 in.,

elliptic-broad or suborbicular-ovate, acuminate; base subcordate and 5-7 nerved, denticulate, membranous, nearly glabrate above; petiole up to 3 in. long with a tuft of bristly hairs at the top. *Panicles* copious, branches ending in cymes. *Flowers* with purple pedicels, calyx and petals; pedicels slender, short. *Calyx* .4 in. long, teeth triangular, acute. *Petals* .3 in. long, ovate, apex, acuminate and slightly pubescent outside. *Longer* anthers deeply 2-cleft at the base, connectives with minute protuberance, shorter anthers not 2-cleft at the base but the connective spurred. *Capsule* about .4 in. long, crowned by the accrescent calyx limb; seeds minute, falcate or nearly so with a truncate apex with 2 unequal beaks at either end, the one on the back long, the other short and continuous with the lateral ridge (raphe).

LAKHIMPUR, KHASI HILLS up to 4,500 ft.

Flrs. and Fr. most of the year, mainly 7-3?

### 3. *Oxyspora cernua* Triana.

A straggling evergreen glabrous shrub (scandent according to Kurz and Brandis), attaining about 12 ft. with long drooping branches, affecting rocky localities. *Leaves* opposite, those of the same pairs often dissimilar in size and to some extent also in shape, uppermost passing into bracts, commonly 4-15 in. long, ovate-lanceolate, acuminate, 5-7 nerved and rounded or cordate at the base, subcoriaceous, dark green and shining above, paler or reddish-brown beneath (in dried state?); petiole .5-2 in. long. *Panicles* lax, up to 20 in. long; rachis sharply quadrangular at the base. *Bracts* and bracteoles persistent. *Flowers* rose coloured, on slender pedicels, .3-.5 in. long. *Calyx* about .4 in. long; lobes broadly ovate, acute. *Petals* .5 in. long, oblong, acute; anthers not spurred, those of the longer stamens slightly diverging at the base. *Capsule* .3-.4 in. long.

KHASI HILLS—Kurz, DAFFLA HILLS—King's Collector-Jamunamukh (ABOR HILLS), Burkhil, NAGA HILLS—Masters.

Flrs. 10-11 (Kurz). Fr. 2-3 (Do.).

## 4. MEDINILLA Gaud.

Branching shrubs or small trees, erect or scandent. *Leaves* opposite or whorled, entire, usually glabrous and 3-9 nerved from the base. *Flowers* somewhat fleshy in lateral or terminal paniced cymes, pink or white, 4 or 5, rarely 6-merous. *Calyx-limb* obscurely toothed or truncate. *Stamens* twice as many as petals, sub-equal, rarely unequal; anthers opening at the top by a single pore; base of the connective not or very shortly produced with two tubercles in the front and often a spur behind. *Ovary* inferior, 4-5, rarely 6-celled; apex glabrous; style filiform; ovules numerous; placenta axile. *Berry* crowned by the limb of the calyx; seeds very many, ovoid or subfalcate, often with thickened raphe.

Cymes axillary; peduncles very short or 0. ... 1. *M. rubicunda*.  
 Cymes usually terminal; peduncles long. ... 2. *M. himalayana*.

1. *Medinilla rubicunda* Bl. Vern. *Bogitenga*, Ass.; *Jajaotler*, Synt.

A shrub or small tree attaining 15 ft. *Branchlets* subterete, somewhat striated; young shoots minutely puberulous, beautifully pink. *Leaves* 2·5-5 by 1·2-3 in., elliptic to lanceolate, shortly rather bluntly acuminate: base narrowed, 3-5 nerved, the stronger pair arising 2·5 in. above the base, pink when young, glabrous with age, minutely punctulate beneath, somewhat fleshy; petiole short, up to 25 in. long. *Flowers* 4-merous, pink in glabrous very short peduncled cymes from axils of existing or fallen leaves; pedicels up to 2 in. long, jointed towards the base with two minute bracteoles from the joint; buds with a conical apex. *Calyx* about 2 in. long; teeth obscure, obtuse. *Petals* rose pink, ovate, 2 in. long. *Stamens* 8, sub-equal, connective shortly produced at the base, spur very short. *Berry* 12-2 in. across, black when ripe, ovoid or subglobose, the short persistent limb of the calyx broader than the narrowed apex; seeds covered with minute raised points, raphe not produced.

KHASI HILLS—3-5,000 ft.; LAKHIMPUR, Upper Dihing Reserve. The leaves are eaten cooked. The fruits though insipid are edible.

Flrs. 8-10. Fr. 1-2.



**2. *Medinilla himalayana* Hk. f.**

A glabrous shrub, sometimes sub-epiphytic. *Bark* pale-brown; branchlets striate. *Leaves* 2·5-4 by 1·1-7 in., elliptic to broadly elliptic, shortly and rather bluntly acuminate; basal nerves 3-5, stronger pair sub-basal; petiole almost 0·1 in. *Flowers* about ·6 in. across, rose, in terminal compound, peduncled cymes. *Peduncles* ·7-1·5 in. long; pedicels up to ·2 in. long, jointed and with a pair of minute bracteoles. *Calyx* about ·2 in. long; limb short; teeth obscure. *Petals* ·25 in. long, ovate. *Stamens* 8; anthers without sput. *Berry* ·3 in. across, spherical; seeds usually subfalcate covered with minute elevated points, raphe not extruded.

KHASI HILLS 5-6,000 ft.

Flrs. 7. Fr. 11.

**5. ANPLECTRUM A. Gray.**

***Anplectrum assamicum* C. B. Clarke.** Vern. *Lota-phutkola*, Ass.

A shrub 8-10 ft. in height; stem, petiole, under surface of leaves along the main nerves and rachis of inflorescence clothed with spreading bristly hairs. *Leaves* opposite, 4·5-7·2 by 1·2-2·6 in., oblong-lanceolate or ovate oblong, sometimes elliptic-lanceolate, acuminate, minutely and distantly denticulate, ultimately nearly entire; base 3-5-nerved, subcordate, narrowed or rounded, often somewhat unequal, subcoriaceous, glabrous above; petiole very short up to ·15 in. long. *Flowers* 4-merous in pyramidal terminal panicles; branches opposite, ending in trichotomous cymes; bracteoles lanceolate to ovate, ciliate, ·2·25 in. long; pedicels short up to ·2 in. long, pubescent. *Calyx* up to ·15 in. long, oblong, glabrous or nearly so with a long limb; teeth obscure, but accrescent. *Petals* 4, whitish, contorted in bud, ·25·3 in. long, ovate with a bluntly pointed and bristle tipped apex. *Stamens* 8, inserted at the base of the limb; filaments 4, bearing long anthers and 4 with shorter anthers; anthers attenuated upwards and opening by one pore (?), connectives of long anthers ending in a cordate appendage, usually with auricled base, those

of short anthers acute with 2 rounded lateral lobes. *Ovary* adnate at the base only, free portion of ovary glabrous 4-celled with a fleshy axile peltate placenta in each, bearing numerous ovules; style subulate, .3 in. long. *Fruit* about .2 in. long, ovoid, baccate; seeds numerous, subfalcate with a dark-brown raphe and parallel lines of minute tubercles.

LAKHIMPUR—common between Gogaldubi and Dulongmukh SIBSAGAR.

Fls. 4-5. Fr. 12.

A little known species, the plant described above matches with sheets in Calcutta herbarium.

#### 6. *BLASTUS* Lour.

***Blastus cochinchinensis*** Lour. Vern. *Phutkala*. Ass.: *Bigbik*, Mik.

A shrub attaining 15 ft.; branches terete; young parts inflorescence and calyx outside densely covered with reddish brown or yellowish-white round scales. *Leaves* 3-5 by .7-1.5 in., oblong to elliptic lanceolate, acuminate, cuneate at the 3-5 nerved base, membranous, covered with minute scales beneath, sometimes also sparsely above; petiole .5-.75 in. long. *Flowers* 4-merous, very small, clustered on protuberances from the axils of existing or fallen leaves; pedicels about .1 in. long, elongating in fruit to about .25 in., slender; bracts 0. *Calyx* about .1 in. long; teeth short. *Petals* equal, much exceeding the calyx teeth. *Stamens* 4, equal; anthers attenuate at the top opening by a terminal pore, cells produced and 2-lobed at the base, connective not appendaged. *Ovary* 4-celled, pubescent at the apex; ovules many on axile placenta. *Capsule* about .15 in. long, opening towards the summit by 4 slits. *Seeds* minute; testa produced into linear arms at either end.

LAKHIMPUR, SIBSAGAR—probably also in other districts.

Fls. 1-2.

***Sonerila maculata*** Roxb.—A small herb, stem with spreading hairs. *Leaves* opposite, 2-4 by 1.2-2.2 in., broadly ovate to lanceolate, serrulate and ciliate on the margins, with spreading hairs on both surfaces or nearly glabrous, membranous, penninerved; base often unequal; petiole 1-2 in. long, hairy. *Flowers* 3-merous, about .5 in. across, mauve, secund at the ends of peduncles, which are up to 3 in.

long *Calyx* thinly hairy. *Petals* elliptic, acute. *Stamens* 3, equal, connective not appendaged. *Ovary* 3-celled, inferior. *Capsule* slightly angled, glabrous, about .25 in. long; seeds numerous, with a slightly excurrent lateral ridge (raphe).

KHASI HILLS 14,000 ft.

Flrs. 8-10.

## 7. MEMECYLON Linn.

Evergreen glabrous shrubs or trees. *Leaves* opposite, sessile or short petioled, coriaceous, penninerved, rarely 3 nerved; nerves inconspicuous. *Flowers* blue or white. tetramerous in simple or paniced often umbelliform cymes or compact sessile fascicles from axils of fallen or existing leaves, rarely terminal. *Bracteoles* 2 or more at or near the base of the pedicels. *Calyx* campanulate, glabrous, dilated and produced far above the ovary, truncate or shortly 4-lobed. *Stamens* 8, equal; filaments long; anthers short, opening by slits, connective thickened at the back and ending in a horn. *Ovary* inferior, 1-celled; apex glabrous, surmounted by disk, usually with 8 radiating grooves; style long, filiform; ovules usually 6-12, sometimes more on a free central placenta. *Fruit* a more or less fleshy globose or ellipsoid, 1, rarely 2-seeded berry crowned by the calyx limbs; cotyledons convolute, foliaceous.

Berry large usually .5 in. and over in length

1. *M. cerasiforme*.

Berry usually .25-.3 in. in length. .

2. *M. edule*.

**1. *Memecylon cerasiforme* Kurz.** Vern. *Kakoi-chera*, Ass.; *Pandauje*, Kach.; *Narakong*, Mik.

A small tree; bark grey with vertical fissures about .4 in. thick. *Leaves* 2.5-6.5 by 1.8-2.5 in., oblong to elliptic, acuminate at both ends, coriaceous, drying, greenish-yellow; lateral nerves faint, obscure; petiole short, up to .3 in. long, stout. *Flowers* not seen.\* *Peduncle* of fruiting cyme .2-.7 in. long, axillary or from axils of fallen leaves; pedicels .2-.25 in. long. *Berries* .5-.6 in. long, broadly ovoid or subglobose, succulent, black when ripe.

\* Flrs. 3-5. Fr. 6-9 since collected—R. N. De.

SIBSAGAR—Barpathar, Garampani, Noajan, etc.  
Wood reddish brown, tough, used for axe handles.

Fr. 10-12.

**Memecylon plebejum** Kurz. Var. *silhetense* C. B. Clarke. Small tree up to 40 ft. in height. *Leaves* 1·5-3 by ·5-1·5 in., lanceolate or elliptic-lanceolate, acuminate, midrib prominent beneath; lateral nerves quite invisible; petiole 12-2 in. long. *Flowers* light blue; peduncles 0-12 in., clustered; inflorescence hardly exceeding ·5 in. *Calyx* at the time of flowering saucer-shaped, small disk on the apex of the ovary prominently rayed. *Berries* not seen.

SYLHET: Chhatak Hk. 1. and T., CACHAR—Prazer.  
An imperfectly known plant.

**2. Memecylon edule** Roxb. Var. *ovata* Clarke. Syn. *Memecylon edule* Roxb. (1995), *M. edule* Var. Thwaites. Vern. *Lali-dimabophang*, Kach.; *Theihadum*, Kuki & Tipp.

A small to moderate sized tree, attaining in favourable situations a height of 50 ft. *Bark* grey, corky with vertical furrows. *Leaves* 3-6 by 1·2-2·2 in., lanceolate-elliptic or ovate-acuminate; base acute, nearly rounded or cuneate; lateral nerves more or less indistinct; petiole 2-25 in. long. *Flowers* bright blue, ·25 in. across. *Cymes* umbellate, usually compound; peduncles 1-several together from the axils of fallen or less frequently existing leaves 2-4 in. long, elongating in fruit; pedicels 2-25 in. long. *Calyx* subrotate when expanded, often pinkish; limb truncate or with rounded obscure teeth. *Petals* 4, about ·1 in. long, blue, fugacious, broadly ovate. *Stamens* blue; filaments long, exerted. *Disk* with about 8 radiating lines usually joined a marginal one. *Berry* globose, 25-3 in. across, blue, 1-2 seeded.

SIBSAGAR, NOWGONG, SYLHET, CACHAR, GOALPARA, probably occurs in most districts in low elevations.

The ripe fruits are eaten. The wood is very hard and is said to be used for pestles.

Fls. 3-6. Fr. 12-2(?).

**Var. cuneata** Thwaites (sp.) *Leaves* lanceolate or oblong, 2·5-4·2 by 1-2 in., shortly acuminate or obtuse, attenuate at the base to the very short petiole; fruit the size of a pea.

NOWGONG.

**Var. *scutellata*** Triana. incl. *M. punctatum* Presl., and *M. scutellatum* Naud. ex Kurz For. Fl. I. 513. Small tree with corky reticulately furrowed dark-grey almost black bark. *Branchlets* with raised decurrent lines from the insertion of the petioles. *Leaves* 2-3 in. by 1-7 in., elliptic or ovate lanceolate, shortly blunt acuminate, subacute or obtuse at apex; base narrowed, punctate on both surfaces; petioles very short, .1-.2 in. long. *Cymes* almost sessile or with very short peduncles. *Disk* rays prominent, of raised lines. *Petals* acute. *Berries* "size of a pea" Kurz.

#### SIBSAGAR.

##### **Memecylon elegans** Kurz.

A small tree or shrub; bark dark grey to blackish, corky, reticulately deeply furrowed; branchlets more or less terete; young branchlets quadrangular or 4 winged. *Leaves* entire, ovate, oblong or elliptic, 1-3 in. by .5-1 in., coriaceous, narrowed into a short petiole; lateral nerves obscure. *Flowers* pinkish in bud (blue-Kurz) in lax cymes sometimes in pairs; peduncles longer than petiole. *Calyx* (free), wider than the ovary; tube truncate. *Disk* rayed. *Berry* small, spherical.

SIBSAGAR (Barpathar). 270 ft.

Fls. 11. Fr. 5.

**M. grande** Retz. Var. *Horsfieldii* Miq. (sp.) cum Var. *khasiana* F. B. I. Syn. *M. celastrinum* Kurz. Vern. *Koyo-asing*, Miri and Abor.

A small tree. *Leaves* 2-5-5 by 1-3-2-2 in., elliptic-lanceolate, acuminate, often caudate; base acute or cuneate, secondary nerves first visible (in dry specimens?) beneath; petiole .2-.25 in. long. *Peduncles* .2-1 in. long, compressed, 1-2 together on leaf axils, bearing cymose umbellules; pedicels .1-.15 in. long. *Flowers* sky blue, small. *Calyx* about .1 in. long, cup-shaped, broadening afterwards, teeth minute, obscure or truncate. *Petals* .1 in. long, ovate, acute. *Disk* rays prominent. *Berries* .25-.4 in. across, 1-seeded, crowned by the short calyx limb.

SIBSAGAR—Diphu Reserve; KHASI HILLS—Griffith; GARO HILLS—Sugiri Valley; DARRANG, N.-E. FRONTIER—Nizamghat.

Fls. 5. Fr. 6.

The plant appears to be scarcely more than a variety of *M. edule*. The forms with larger fruit do not match with any sheets either at Calcutta or Dehra Dun and it is possible that two species have been included here, but this cannot be definitely ascertained till more material is available. In the Calcutta herbarium both var. *Horsfieldii*

and var. *khasyana* of *M. grande* have been grouped together under *M. celsastrinum* Kurz—by King.

**Tibouchina semidecandra** Cogn. —A shrub or a small tree; branchlets, petiole and axis of inflorescence clothed with soft spreading hairs; young parts silky, villous. *Leaves* 3-5 by 1-2-2-2 in., elliptic to lanceolate-acuminate or acute, 5-7 nerved, softly hairy on both surfaces, more densely beneath; petioles .3-.5 in. long. *Flowers* 3-3.5 in. across, purplish-blue, very showy, sessile or nearly so in compound cymes from ends of branches or upper leaf axils; bracts about 1 in. long, somewhat harshly pubescent outside, red with age enclosing the buds, caducous. *Calyx* adpressed pubescent; calyx tube .5 in. long; lobes 5, oblong-lanceolate, as long as the tube or slightly longer, deciduous, glabrous inside, often bordered with red on the margins. *Petals* 5, broadly obovate, about 1.5 in. long. *Stamens* 10, alternately short and long; filaments declinate, glandular hairy except at the top; anthers bluish purple, narrowed at apex, connective produced at the base, 2-tubercled. *Ovary* 5-celled; ovules numerous on radiating placentæ.

A native of Tropical America. Cultivated in Shillong, where apparently the fruit does not ripen. Very handsome when in flower.

Flrs. 7-11.

#### **Sarcopyramis nepalensis** Wall.

An erect glabrous herb; stem quadrangular, succulent. *Leaves* 2-3.5 in. long, ovate, long-acuminate, membranous; petiole .5-2 in. long, often longer; base 3-nerved. *Stamens* 8, equal; style filiform. *Capsules* open by 4 valves crowned with four large scales. *Seeds* numerous.

KHASI HILLS 4-6,000 ft.

Flrs. and Fr. 9-12.

### **FAM. 60. LYTHRACEÆ.**

Trees, shrubs or herbs often with quadrangular branches. *Leaves* entire, opposite, sometimes whorled, rarely alternate; stipules 0. *Inflorescence* various, often cymose or paniced. *Flowers* 2-sexual, rarely unisexual (Crypteronia). *Calyx-tube* usually free, persistent; lobes 3-6, often with few accessory teeth, valvate. *Petals* as many as calyx teeth,

often crumpled and imbricate in bud, rarely 0, inserted on the top of the calyx tube. *Stamens* inflexed in bud, very many or definite, inserted on the calyx tube. *Ovary* free, rarely inferior; style usually long; stigma capitate, rarely 2-lobed; ovules numerous, usually on axile rarely parietal placentæ. *Fruit* dehiscent or not, free or adnate to the base of the calyx, 2-6 celled or 1-celled by the absorption of the dissepiments. *Seeds* many, sometimes winged, albumen 0.

I. Petals present, flowers bisexual —

A. Calyx tube not coloured, leaves not gland dotted :

Flowers 6-merous; seeds winged. 1. *Lagerstrœmia*.

Flowers 4-8-merous; seeds minute, tailed at either end. . . . 2. *Duabanga*.

B. Calyx tube scarlet; leaves dotted with black glands :

Flowers zygomorphic, calyx tube tubular. 3. *Woodfordia*.

II. Petals 0 :

Flowers minute, greenish, polygamous; capsule 2-valved. . . . 4. *Crypteronia*.

### I. LAGERSTRŒMIA Linn.

Trees or shrubs. *Leaves* opposite or subopposite, distichous, entire; petiole short. *Flowers* handsome, bracteate, in terminal and axillary panicles; bracts and bracteoles usually paired. *Calyx-tube* cupular or campanulate, coriaceous, smooth or ribbed outside, persistent; lobes valvate, 6 or more. *Petals* 6 or more, wrinkled or crisped, alternating with the calyx lobes. *Stamens* numerous, inserted at the base of the calyx-tube; filaments often curled, filiform, usually some sterile; anthers versatile. *Ovary* 3-6 celled, superior; style long, filiform; stigma capitate; ovules numerous on axile placentæ. *Capsule* coriaceous, more or less adnate to the base of the calyx, loculicidally dehiscent, 3-6 celled; seeds numerous, winged at the apex, erect, compressed.

Capsules over .5 in. long :

Flowers white, .3-.5 in. across; calyx tube not ribbed; leaves greyish beneath. . . . 1. *L. parviflora*.

Flowers mauve, 2-3 in. across; calyx tube prominently ribbed; leaves green beneath. . . . .

2. *L. Flos-Reginæ*.

Capsules under .3 in. long:—

Flowers white; calyx ribbed. . . . . 3. *L. minuticarpa*.

1. *Lagerstroemia parviflora* Roxb. Var. *bengalensis* Clarke. Vern. *Sida*, *Dhauri*, Ass.: *Thengkri*, *Thengkiri*, *Theng-khri-arong*, Mik.; *Bonshitha*, *Bongurudi-phang*, *Ajrai*, Kach.; *Jarol*, Kuki; *Sidai*, *Bolsidai*, Garo; *Dieng-lang-sing*, Kh.; *Bordhiera*, Nep.

A large to medium sized deciduous tree; branchlets sharply 4 angled, often slightly winged. *Bark* grey or brown, peeling off in thin strips, .5-1 in. thick, reddish-brown and fibrous inside; young parts pubescent. *Leaves* 2-4 by 1-1.5 in., elliptic, oblong or ovate, acuminate or acute, glabrous above, grey and more or less pubescent or puberulous, specially along the nerves beneath, coriaceous; lateral nerves 5-7 on either half, upper meeting in loops, tertiaries prominently reticulate above; petiole very short. *Flowers* .3-.5 in. across, white, fragrant in lax axillary and terminal, downy panicles of cymes; cymes 2-5 flowered, peduncled; pedicels slender up to .25 in. long; bracts leafy, grading into leaves; bracteoles setose. *Calyx-tube* broadly cupular, enlarging and woody in fruit, lobes 6, triangular or lanceolate acute. *Petals* 6, membranous, about .25 in. long, ovate-oblong, margin undulate; outer 6 stamens longer than the rest. *Capsules* .6-.9 in. long, ovoid or ellipsoid, polished, about a quarter immersed in the accrescent calyx, 3 sometimes 4 valved; seeds with a terminal wing which is thickened and somewhat curved on the back, .65-.75 in. long, including the wing.

All over the province except LAKHIMPUR and N.E. FRONTIER DISTRICTS, ascending to 2,000 ft. in the KHASI HILLS.

Wood greyish brown, hard, annual rings absent. It polishes well and could be used for agricultural implements, country boats house posts, etc.

Flrs. with new leaves 3-6. Fr. 11-12, long persistent on the tree.

The small fruited form with pubescent leaves has been grouped under Var. *bengalensis* by C. B. Clarke in F. B. I., but as intermediates with larger fruits and pubescent to glabrescent leaves are common in our area, I have not separated the form.



2. **Lagerstroemia Flos-Reginæ** Retz. Vern. *Ajar*, *Ajhar*, Ass.; *Jarul*, Beng. (Sylh.); *Thing-dou*, Kuki and Lushai; *Jaroi*, *Thing-doi-thing*, Tipp.; *Aojar*, Mech.; *Ajakari*, *Bolasari*, Garo; *Chehar-arong*, *Ojhar*, Mik.; *Ajar-asing*, Mik.; *Dieng-ther*, Kh.

A large and rather branchy tree. *Bark* light grey or pale brown, smooth, peeling off in irregular flakes. *Leaves* usually 4·8-5 in. by 1·5-3·2 in., elliptic, oblong-elliptic or oblong-lanceolate, acuminate, glabrous on both surfaces, nerves prominent beneath, 10-12 on either half, joining to form an intramarginal nerve which becomes discontinuous towards the base; petiole ·2-·4 in. long. *Flowers* very handsome, mauve purple, 2-3 in. across in downy terminal panicles up to 1 ft. long, ultimate branches cymosely 1-3 flowered; pedicels stout, pubescent, jointed below the middle. *Calyx* ·5-·6 in. long, turbinate, covered with grey or brown tomentum, tube ribbed, ribs 12-14, alternately broad and narrow; teeth 6-7, spreading, acute. *Petals* 6-7, 1-1·5 in. long, much crumpled and wavy with deeper coloured veins, margins erose, claw ·25-·3 in. long. *Capsules* ·75-1·25 in. long, oblong-ovoid or subglobose, smooth, seated on the persistent somewhat woody and prominently ribbed enlarged calyx tube, 5-6 valved; seeds including the wing about ·5 in.

Throughout the province chiefly found along river banks, old alluvial soils and edges of swamps, sometimes gregarious. Very handsome when in flower for which it is cultivated in most parts of India.

The wood is light reddish brown with very fine medullary rays and pores joined by very fine concentric bands of softer tissue. The timber is excellent and is used for buildings, carts, furniture, etc.

Flrs. 6-8. Fr. cold season.

3. **Lagerstroemia minuticarpa** Debbarman ex P. C. kanjilal. Vern. *Sinkrit-asing*, *Kunari-asing*, Miri; *Singkut-polut*, Abor.

A large tree 100-130 ft. tall, often with very irregularly fluted stem. *Bark* greenish brown or nearly white, thin, about ·12 in. thick, exfoliating in large thin pieces. *Bark* of branchlets peeling off in narrow membranous shreds. *Leaves* opposite, rarely alternate, deciduous, 4·5-5 by 2-2·7 in., elliptic or oblong, ovate-lanceolate, acuminate, subcoriaceous,

puberulous along the midrib and with tufts of hair along nerve axils beneath, otherwise glabrous when mature; lateral nerves 9-12 on either half, arched, upper meeting in loops, tertiaries somewhat laxly sub-parallel, quarternaries reticulate; base often unequal, cuneate or rounded, areoles .025 to .05 in. across; petiole .3-.5 in. long. *Panicles* 3.5-5 in. long, terminal, densely pubescent; lower bracts leaf-like; bracteoles lanceolate or subulate, about .1 in. long, caducous; buds clavate or turbinate with a short projection at the apex. 12 ribbed, pubescent; pedicels .075 to .15 in. long. *Calyx* whitish, about .15 in. long, broadly campanulate, thinly pubescent, tube about .1 in. long, ribbed along the sinuses and the back of the teeth; calyx-teeth 6, deltoid, acuminate, thinly pubescent towards the apex within. *Petals* 6, white, oblong, about .27 in. long, crumpled, margins crisped, claw minute. *Stamens* about 12; filaments filiform, 6 stouter than the rest. *Ovary* 6-celled; style curved, exserted, .2-.25 in. long; stigma capitate; ovules numerous on 6 axile placenta. *Capsule* ellipsoid or oblong, .21-.28 in. by .1-.15 in., 4-valved. *Seeds* .15-.2 in. long, wings dorsally ridged, subfalcate, pellucid, .1-.12 by .04-.06 in.

N.-E. FRONTIER, near Bomjur, Lali, Bereng, Kherompani.

Wood light brown, fairly hard; pores usually in short strings, joined together by softer tissue, medullary rays very fine, annual rings distinct.

Fls. 8-10. Fr. Cold season long persistent.

**Lagerstroemia indica** Linn. *Parul*, Sans. The crepe plant or crepe myrtle.—A handsome small tree with smooth ashly or nearly white bark, peeling off in thin pieces; branchlets sharply quadrangular. *Leaves* 1-3 in. long, elliptic or obovate, subobtusely or subacute, glabrous. *Flowers* very handsome in several shades of white, rose or mauve, 1.5-2 in. across, when open, in dense small panicles. *Calyx* not ribbed. *Petals* long clawed and with much crisped blades, outer whorl of 5-7 stamens larger than the others. *Capsules* less than .5 in. across.

Cultivated throughout the province.

The leaves turn red before falling.

Fls. rainy season.

## 2. DUABANGA Ham.

**Duabanga sonneratioides** Ham. Vern. *Thora* (Kamrup), *Khukan*, *Hokol*, Ass.; *Ramdal*, Sylh.; *Yaglongphang*,

*lao glau*, Cach.; *Banthang*, Tipp. & Kuki; *Manjuong*, Kuki; *Munjinarong*, Mik.; *Dieng-moloi*, *Dieng-bai*, *Dieng-param*, Kh.; *Pi-arong*, Mik.; *Jong*, Lushai; *Kaliangshi*, *Bol-chhim*, Garo; *Lompatia*, Nep.; *Kobo-asing*, Abor & Miri; *Kisadi*, Naga; *Bandar-kanda*, Mech.

A tall handsome tree with drooping branchlets. *Bark* rough, grey, with vertical fissures, thick in old trees; *blaze* dirty brown. *Leaves* opposite, distichous, red when young, 6-11 by 2.5-4.5 in., oblong to ovate-oblong, shortly acuminate, cordate, coriaceous, glabrous on both surface; lateral nerves 20-25 on either side, subparallel, meeting in an intramarginal nerve close to the margins; tertiary nerves prominent; petiole stout, .1-.25 in. long, margined. *Flowers* 2-3 in. across with an unpleasant smell, in glabrous compound terminal corymbs; buds globose; pedicels .7-1 in. long, stout. *Calyx* cup-shaped, persistent, deeply 6-8 lobed; segments .7-.8 in. long, thick, ultimately spreading. *Petals* creamy-white, falling off early with the stamens, about 1-1.25 in. long, obovate, clawed, crumpled, margins erose, delicately veined. *Stamens* numerous in one series; filaments exserted, inflexed in bud. *Ovary* adnate to the calyx at its base, 4-8 celled; ovules numerous, ascending on thick placenta; style exserted, incurved in bud; stigma clavate, 4-8 lobed. *Capsule* coriaceous, about 2.5 in. across, loculicidally splitting into 4-8 valves. *Seeds* minute; testa produced at both ends into pointed tails.

All over the province ascending to 2,000 ft., in the KHASI HILLS, sometimes gregarious in river banks.

Wood greyish-brown, soft, weighing about 32 lbs. per c. ft. It was formerly used for tea boxes for which it was found unsuitable on account of the yellowish stain it gives rise to and its unpleasant smell. It is, however, well suited for manufacture of ply wood.

### 3. WOODFORDIA Salisb.

*Woodfordia fruticosa* Kurz. Syn. *W. floribunda* Salisb. Sans. *Agni-jwala*, *dhatiri*, Vern. *Dheira*, Nep.

A large spreading shrub with reddish brown bark, peeling off in thin strips; blaze pink; young parts hairy; leaves and branchlets covered with black dots. *Leaves* sessile or subsessile, opposite, sometimes in whorls of three,

distichous, 2-5 by .6-1.5 in., lanceolate or ovate-lanceolate, acuminate; puberulous above, grey and pubescent with more numerous glandular dots beneath; lateral nerves 6-12, meeting in an intramarginal nerve, base rounded or cordate. *Flowers* scarlet, shortly pedicellate, zygomorphic, in short panicles of closely clustered cymes, usually from the axils of fallen or existing leaves; peduncles and pedicels pubescent, usually glandular; lower bracts more or less leafy, upper smaller, brownish; bracteoles minute. *Calyx* scarlet, .4-.6 in. long, persistent, tubular, somewhat curved, oblique at the mouth; lobes 6, about .07 in. long or deltoid, alternating with 6 rudimentary hairy teeth. *Petals* 6, white, acute, scarcely exceeding the calyx lobes. *Stamens* 12, inserted at the base of the calyx tube, exserted, declinate; filaments red; anthers versatile. *Ovary* superior, 2-celled; ovules numerous; style filiform, exserted. *Capsule* with very thin walls, ellipsoid, splitting irregularly, included within the persistent calyx tube. *Seeds* numerous, minute.

KAMRUP, GOALPARA, not common.

The flowers give reddish or yellowish dye which is used in many parts of India for dyeing silk. The leaves and flowers also contain a large percentage of tannin.

Flrs 1-3. Fr. 4-5, nearly leafless in 2-3.

Leaves on seedlings are alternate, very young seedlings are red.

#### 4. CRYPTERONIA BL.

**Crypteronia paniculata** Bl. Incl. *C. glabra* Bl. Vern. *Goru-mora*, Ass.; *Bol-luen*, *Masuging-sep*, Garo; *Dieng-saw-kyr-reng*, *Dieng-oy*, Kh.; *Thengpi-toreie-arong*, Mik.

A large tree with spreading crown and fluted stem. *Bark* pale grey or brown, exfoliating in long curled up, somewhat brittle strips, exposing a cinnamon brown surface, chocolate or reddish-brown inside, about .15-.2 in. thick. *Branchlets* glabrous. *Leaves* opposite, 2-farious, 4-7 by 1.3-2.5 in., lanceolate or elliptic to ovate-lanceolate, entire, acuminate; base acute or tapering to the petiole, subcoriaceous, glabrous. (in our area); lateral nerves 6-8, except the lower, arcuate and meeting in loops; petiole about .25 in. long. *Flowers* greenish-white, polygamo-dioecious, minute, about .1 in.

across, in elongate, puberulous panicle racemes, branched from near the base or fascicled at the ends of branches or on the nodes, 3·5-7 in. long; pedicels ·05 in. long, filiform; bracts minute, setose, shorter than the pedicels. *Calyx-tube* short, puberulous, persistent, cup-shaped, spreading in fruit. *Calyx* teeth usually 5, rarely 4, triangular, acute. *Petals* 0. *Stamens* usually 5, alternating with the calyx teeth, and inserted near the top, often unequal. *Ovary* free, globose, grey pubescent, 2-celled; style long; stigma capitate, sub 2-lobed; ovules numerous on axile placentas. *Capsule* 2 celled, small, about ·07 in. across, globose, pubescent, crowned by the persistent style, dehiscing at the top, across the dissepiment, and the style. *Seeds* numerous, minute; testa produced at each end.

LAKHIMPUR, KAMRU P. CACHAR, SIBSAGAR, GARO HILLS, foot of the KHASI HILLS, probably also in DARRANG.

The wood is reddish-brown, soft, pores distant, medullary rays fine, annual rings indistinct. It is being used for sleepers after antiseptic treatment.

Fls. 11-12. Fr. 2-3.

Like Brandis I have followed C. B. Clarke's suggestion in including under this species Blume's *C. glabra*, which is the form occurring in our area.

The genus has been excluded from Lythraceæ in Engler's Pflanzenfamilien.

**Punica Granatum** Linn. The pomegranate. *Darimba*, Sans.; Vern. *Dalim*, Beng. and Ass.; *Darmi*, Nep.; *Anar*, Hind.; *U. soh-pomegranate*, Kh.

A large deciduous shrub, often armed. *Leaves* opposite, 1-2·5 in. long, oblong-ob lanceolate or oblong-lanceolate, shining, glabrous, entire, pellucid-punctate, narrowed at the base to a very short petiole. *Flowers* bright scarlet, about 1·5-2 in. across, solitary or 2-4 together. *Calyx* campanulate, adnate to and produced beyond the ovary, accrescent in fruit, 5-7 lobed. *Petals* crumpled. *Stamens* numerous. *Ovary* inferior, many celled in two whorls. *Berry* globose, many celled. *Seeds* angular with a pinkish or red watery outer coat.

Cultivated in most Districts.

#### AMMANNIA Linn.

Annual glabrous, aquatic herbs with minute flowers in trichotomous cymes. *Calyx* membranous. *Stamens* 2-8.

The following species occur in the Province :—

**Flowers axillary, in spikes :—**

Calyx in fruit campanulate, larger than broad :-

1. **A. peploides** Spreng.  
Herb.  
Capsule 2-valved  
Cauline leaves elliptic.  
GOALPARA.  
Fr. 1.
2. **A. rotundifolia** Ham.  
Herb.  
Capsule 4-valved.  
Leaves orbicular.  
SHILLONG.  
Fr. 3.

Flowers in cymes.

3. **A. baccifera** Linn.  
Herb.  
Leaves oblong or narrow elliptic;  
cauline leaves 2 ft. by .4 in. (or less).  
Capsule globose and imperfectly circumsciss.
4. **A. multiflora** Roxb.  
Herb.  
Leaves oblong, elongate, sub-auriculate.  
Cauline leaves 1-1.5 in. long.  
Capsule globose, not enclosed by the calyx.  
KHASI HILLS. (Kaling.)  
Fr. 12.

## FAM. 61. ONAGRACEÆ.

Herbs, rarely undershrubs, sometimes aquatic. *Leaves* opposite or alternate, exstipulate. *Flowers* bisexual, regular or sometimes irregular. *Calyx-tube* wholly adnate to the ovary (half adnate in Trapa), lobes 2-5, usually 4. *Petals* alternating with the calyx lobes, rarely 0. *Stamens* as many or twice as many as the petals inserted with them. *Ovary* inferior (half inferior in Trapa), 1-6, usually 4-celled; style simple or with 2-4 lobed stigma; ovules 1-many in each cell

on axile placentas. *Fruit* dehiscent or indehiscent 1 (Trapa) or many seeded.

- |   |                         |
|---|-------------------------|
| I. Seeds many; fruit capsular :         |                         |
| Seeds comose.                           | .. 1. <b>Epilobium.</b> |
| Seeds not comose :                      |                         |
| Stamens twice as many as calyx lobes.   | .. 2. <b>Jussiaea.</b>  |
| II Seeds 1; fruit with spiny pericarp : |                         |
| Aquatic herb.                           | .. 3. <b>Trapa.</b>     |

### 1. EPILOBIUM Linn

Herbs or undershrubs. *Leaves* alternate or opposite, simple entire or toothed. *Flowers* axillary and solitary or racemed or spiked at the ends of the branches, pink, purple or white, regular or irregular. *Calyx-tube* linear, scarcely produced above the ovary, teeth 4, lanceolate, deciduous. *Petals* 4, obovate, retuse or notched. *Stamens* 8, epigynous, alternate ones shorter. *Ovary* inferior, 4-celled; style cylindric; stigma 4 lobed or more or less combined; ovules many, axile. *Capsule* linear, 4-celled, valves separating from the seeds bearing central column. *Seeds* numerous, obovoid or ellipsoid, crowned by long silky hairs.

Stems not sharply quadrangular :

- |  |                          |
|--|--------------------------|
| Stem pubescent with curled hairs; leaves thinly pubescent on the nerves only.          | .. 1. <i>E. Hookeri.</i> |
| Stem villose; leaves adpressed villous on both surfaces; flowers 1 in. or more across. | 2. <i>E. khasianum.</i>  |
| Stems sharply quadrangular.  | 3. <i>E. tetragonum.</i> |

#### 1. **Epilobium Hookeri** C. B. Clarke.

A perennial herb or undershrub attaining 3 ft.; stem and inflorescence pubescent with curled hairs, terete, upper leaves alternate, lower opposite, 1·2-1·7 by ·4-·8 in., elliptic or ovate to oblong lanceolate or oblong, subacute; base more or less rounded, denticulate; nerves about 6 on either side, impressed above, thinly pubescent, specially on the nerves; petiole very short, margined. *Flowers* purple, about ·4 in. across, in paniced racemes; bracts leafy; pedicels slender, up to ·25 in. long. *Calyx-tube* ·7-·8 in. long, adpressed, villous; lobes oblong-lanceolate, about ·25

in. long. *Petals* obovate, .3 in. long; stigma clavate, elongate. *Capsules* 2-3 in. long. *Seeds* obtuse at the apex, oblong; coma silky.

KHASI HILLS, 4-6,000 ft.

Flrs. 9-10.

## 2. *Epilobium khasianum* C. B. Clarke.

An undershrub with villous stem. *Leaves* 1.2-1.7 by .4-.7 in., upper alternate, lower opposite, subsessile, elliptic lanceolate to oblong, subacute; base narrowed, denticulate, adpressed villous with tawny hairs on both surfaces; lateral nerves impressed, 5-6 on either side. *Flowers* rose purple in panicked racemes. *Calyx-tube* about .7 in. long, villous, lobes lanceolate acuminate, about .3 in. long. *Petals* about .5 in. long. *Stigma* clavate. *Capsule* 2-3 in. long, fruiting pedicels up to 1 in. long. *Seeds* obtuse at the apex, coma pale brown, silky.

KHASI HILLS 4,500-5,500 ft.

Flrs. 9-10.

## 3. *Epilobium tetragonum* Linn.

A herb up to 3 ft. high, stem quadrangular with curled hairs on the four angles. *Leaves* .5-2 in., subsessile, oblong or narrow elliptic, denticulate-serrulate; nerves prominent on the undersurface, crisped-hairy. *Flowers* rose or purple, small. *Capsule* 1.5-2 in. long.

KHASI HILLS 4,500-6,000 ft.- C. B. Clarke.

*Epilobium angustifolium* Linn. Herbaceous. *Leaves* narrow or linear, lanceolate, 2-4 in. long, acuminate. *Flowers* irregular; petals purplish. *Stamens* deflexed on one side. *Style* bent, hairy; stigmas 4. *Capsule* 2-3 in. *Seed* obovoid.

(Mann's No. 319).

## 2. JUSSIÆA Linn.

### *Jussiea suffruticosa* L. Var. *exaltata* Roxb.

An erect undershrub attaining 4-5 ft. in height, stem with raised decurrent lines from leaf bases, usually more or less hairy; young parts pilose. *Leaves* 1.5-3.7 in. long, linear or



narrow-lanceolate, acute or acuminate, thinly pubescent or hairy, usually along the nerves; lateral nerves 12-20 meeting to form an intramarginal nerve; base narrowed. *Flowers* yellow, .66-.7 in. across, about .9 in. long, solitary in leaf axils, usually tetramerous, shortly pedicelled. *Calyx-tube* linear, wholly adnate to the ovary, pubescent, lobes ovate-elliptic, about .3 in. long. *Stamens* twice as many as petals, epigynous. *Capsule* cylindric 1.1-1.5 in. long, ribbed, more or less pubescent, thin-walled, irregularly breaking up between the ribs. *Seeds* minute, reddish-brown, grooved.

In water-logged situation up to 3,000 ft. in the KHASI HILLS.

Flrs. and Fr. probably throughout the year.

Ridley states in the Journal of Botany, p. 259, Vol. LIX (1921) that the plant called *J. fissendocarpa* by Haines in Journal of Asiatic Society, Vol. XV, No. 7, is the real *J. suffruticosa*. Our plant is probably *J. erecta* L. Var. *exaltata*. The older name has been retained for the present as the exact name is difficult to determine from Ridley's paper.

Flrs. and Fr. throughout the year.

#### *Circæa alpina* L. nn.

An erect herb. *Leaves* .5-.9 in. long, ovate, almost glabrous, membranaceous. *Flowers* small, in terminal peduncled racemes. *Bracts* minute. *Calyx* limb bipartite. *Petals* 2, white. *Stamens* 2, epigynous; ovary inferior, 1-celled. *Fruit* very small, pyriform with hooked hairs.

KHASI HILLS, 5,000 ft.

Flrs. 8.

### 3. TRAPA Linn.

**Trapa bispinosa** Roxb. Vern. *Singara*, Beng., Hin.: *Paniphal*, Beng.; *Sringataka*, Sans. The water chestnut.

An aquatic floating, herb. *Leaves* dimorphic, submerged leaves opposite, pinnately cut into thread like segments, looking like roots, floating leaves in rosettes, green, mottled with brown, broadly rhomboid, 1.2-2 by 1.5-2.2 in., toothed except towards the base, densely hairy and reddish purple beneath; petiole up to 5 in. long, swollen and spongy near the top, the inflated portion about 1 in. long, hairy. *Flowers* few, white, tetramerous, close to the surface of water; pedicels stout, short and incurved at first, afterwards elongated and submerged. *Calyx* hairy, half superior, 2 of

the lobes enlarging and becoming spinescent in fruit. *Petals* obovate. *Stamens* 4. *Fruit* single seeded, 1-1.5 in. long, hard, obovoid with a short beak and two lateral sharp spines, dark brown or black when ripe, surface uneven.

In jhils.

The fruit is largely eaten and finds a ready sale.

Flrs. and Fr. cold season.

**Trapa natans** Linn. -Floating leaves about 1 in. across, sparingly hairy beneath on the nerves; fruit with spines on all the 4 angles.

SYLHET- *Roxburgh*, but does not appear to have been collected since.

Several species of *Oenothera* are cultivated in gardens for their showy flowers.

**Oenothera rosea** Soland. A small plant about 1 ft. high with pink flowers with obovate petals -has run wild in Shillong. A native of Mexico.

Fuchsias of several species are grown in Shillong and thrive fairly well.

**Oenothera Drummondii** Linn.

Herbaceous, hairy, more so in young parts. *Leaves* lanceolate or oblong-lanceolate, acute or shortly acuminate, membranaceous, hairy on both sides; lateral nerves 8-10 on either side. *Flowers* solitary, axillary, irregular. *Calyx* tube about 1-2 in. long, wholly adnate to the ovary. *Segments* 4, reddish. *Petals* bright yellow, 4, broadly ovate, epigynous. *Stamens* 8; anthers versatile. *Ovary* inferior; style about 1.5 in. long; stigma 4-partite. *Capsule* 4-celled, about 1 in. long, ellipsoid. *Seeds* numerous, blackish.

KHASI HILLS, 4-5,000 ft. Cultivated running wild.

Flrs. and Fr. 7-9.

## FAM. 62. PASSIFLORACEÆ.

Herbs or shrubs usually climbing by tendrils, rarely erect. *Leaves* alternate, stipulate, simple or lobed, palmi- or penni-nerved, frequently glandular beneath or on the petiole; stipules foliaceous or minute. *Flowers* in axillary cyme, sometimes with one or more of the branches ending in a tendril, rarely solitary. *Bracteoles* 3, rarely solitary,

minute and scattered or forming an epicalyx, rarely 0. *Flowers* regular uni or bisexual. *Calyx* tubular or campanulate; segments 5, imbricate, corona of one or more rows of thread-like filaments or scales or annular from the calyx-tube, sometimes absent. *Stamens* usually 5, springing from the gynophore or free at the base: anthers oblong, 2-celled, basifixed or versatile, introrse. *Ovary* superior on a gynophore or sessile, 1-celled, usually with 2, rarely 4 or 5 parietal placentas: ovules numerous, 2-many seriate; styles free or connate; stigmas usually more or less capitate. *Fruit* a berry or capsule. *Seeds* numerous ovoid or flattened, testa usually pitted with a fleshy cotyledon, foliaceous.

Flowers hermaphrodite; stamens hypogynous .. 1. *Passiflora*.  
 Flowers unisexual; stamens perigynous. .. 2. *Moedecca*.

### 1. *Passiflora* Linn. The Passion flowers.

Climbers. *Flowers* 2-sexual. *Calyx-tube* fleshy, segments often coloured within. *Petals* free, inserted on the throat of the calyx. *Corona* usually of one or more rows of filiform segments, springing from the mouth of the calyx-tube and of one or more membranous folds arising lower down the shallow basal cup surrounding the gonophore. *Stamens* 5 on the gonophore; anthers dorsifixed. *Styles* usually 3. *Fruit* baccate.

*Petals* present :

*Leaves* semiorbicular, truncate and 3 cuspidate at the apex; fruit 2 in. long. .. 1. *P. Leschenaultii*.

*Leaves* ovate-lanceolate, not lobed, fruit 5 in. across not lobed. .. 2. *P. nepalensis*.

*Leaves* 3 lobed :

*Flowers* with conspicuous pectinate bracts - whole plant fetid when bruised. .. 3. *P. fetida*.

*Petals* 0 :

*Leaves* lanceolate. .. 4. *P. suberosa*.

### 1. *Passiflora Leschenaultii* DC.

A climbing shrub. *Leaves* semiorbicular, broader than long, truncate and 3 cuspidate at the apex, 3-nerved, glabrous or more or less pubescent on the nerves beneath, thinly

subcoriaceous; base rounded; petiole about 1 in. long with 2 glands below the middle. *Flowers* about 2 in. across, white, usually solitary on slender elongate peduncles; bracteoles remote, linear. *Calyx-tube* subrotate with a short tube lobes oblong. *Petals* as long as the sepals. *Outer corona* of two rows, filiform; *inner corona* short, tubular, membranous, plicated; *basilar corona* small, cup-shaped, surrounding the base of the gynophore. *Fruit* about 2 in. long, glabrous, leathery.

MANIPUR Watt, KHASI HILLS C. B. Clarke (in F. B. I.).

**2. *Passiflora nepalensis* Wall.** Vern. *Mi-soh-lah, Soh-ksem*, Khasi.

A glabrous climber with slender angular branches. *Leaves* 2-4 by 1.5-2 in., ovate-lanceolate, acute or acuminate, apiculate, more or less 3 nerved, other lateral nerves weak, arched glabrous or somewhat glaucous beneath; base truncate or subcordate; petiole 1-3 in. long, usually with 2 raised glands. *Peduncles* 4-5 from each axil, 1-1.5 in. long, petioles jointed above the middle, usually 1-flowered. *Flowers* about .5 in. long, pale yellow. *Calyx-tube* about .2 in. long, cylindric lobes nearly equalling the petals; *corona* filiform of several rows. *Fruit* .5 in. across, globose, purplish.

KHASI HILLS 3-6,000 ft.

Fls. 7-9. Fr. 10.

**3. *Passiflora foetida* Linn.**

A slender climbing shrub, foetid smelling when bruised. *Leaves* 1.5-3.5 in. long, usually 3-lobed; lobes shortly acuminate or acute; lateral shorter, usually 5 nerved, membranous, margins ciliate with gland tipped setaceous hairs, similar hairs on the petiole along the margin above; retuse; base broadly cordate or petiole 1-2 in. long; stipules lacinate with gland tipped segments. *Flowers* 1.25 in. across, greenish-white, mostly solitary with an epicalyx of pinnatifid bracteoles cut up into moss-like gland tipped pectinate segments, about .5 in. long enlarging with age. *Coronal processes* filiform, white and purple. *Fruit* globose, about .7 in. across, greenish, invested by the epicalyx.

Fairly common as an escape in most districts in the plains along roadsides and in vicinity of habitations. An inhabitant of Tropical America.

Flrs. hot and rainy season. Fr. 11

#### 4. *Passiflora suberosa* Linn.

A climbing herb. *Leaves* lanceolate, 3-4 by 1-1.5 in., subcoriaceous, strongly nerved; petiole jointed in the middle. *Flowers* small; bracteoles absent or if present not forming an epicalyx under the flower. *Petals* absent.

A native of Tropical America, sometimes occurring as an escape in village hedges.

#### *P. adenophylla* Mast.

A slender but fairly extensive climber. *Leaves* pale green, 3 lobed, 2.3 by 2.5-4.5 in.; lobes sub-obtuse, mucronate, membranous, entire, except for few glandular serratures near the sinuses; base sub-truncate or broadly retuse, 5 nerved; petiole 1-2 in. long with glands; stipules large, leafy, about 1.25 in. long, broadly subfalcate, auricled at the base. *Flowers* 2-3 in. across, solitary; peduncles with 3 leafy bracteoles near the top. *Petals* purplish blue; coronal filaments blue and white.

A native of Madagascar. Naturalized in the KHASI HILLS, 4-5,000 ft.

Flrs. 8.

*P. edulis* Sims. The passion fruit from Brazil. Vern. *Khasia Bel*, Beng. A perennial climber with 3-lobed, toothed, glabrous leaves; large bluish purple flowers and purplish edible fruits. The pulp has strong *bael* like smell whence the Bengali name.

Besides the above several other species are cultivated in gardens in our area.

#### *P. laurifolia* Linn.

A climber, herbaceous, entirely glabrous, but fairly extensive; tendrils simple, axillary, long. *Leaves* 4-5-6 by 1-7-2.5 in., entire, ovate, oblong; petiole short. *Flowers* large, blue, fragrant, solitary or in axillary peduncles. *Involucre* 3-leaved. *Corona* 3-plex. *Berry* greenish yellow, white punctate. *Seeds* compressed, cordate.

Cultivated, but is naturalized in some places, e.g. Gogong Bil (Kulsi reserve), KAMRUP. NOWGONG (Kukrakata Reserve).

## 2. MODECCA Lam.

### *Modecca trilobata* Roxb.

A large glabrous climber; branchlets sulcate. *Leaves* distant, 6-8 in. long, palmately 3-5 lobed, upper lobes with

deep sinuses, cordate, sub-truncate or hastate at the base, membranous; main lateral nerves 2 on either side, lowest sub-basal, connected by more or less subparallel tertiaries, 2 circular glands on the undersurface near the base; lobes acuminate; petiole 2·5-4 in. long with two glands at the apex. *Flowers* unisexual; peduncle axillary, 6-10 in. long, divided into 2-3 branches near the top, one of which ends in tendrils and the others in many flowered often cirrhose cymes. *Male flowers*:—*Calyx* less than ·5 in. (Masters) campanulate, 5 lobed. *Petals* obovate-oblong, springing from the base of the calyx-tube. *Stamens* 5, united at the base; filaments slender; anthers obtuse. *Glands* of the disk ligulate, incurved, opposite the sepals. *Pistillode* minute. *Calyx* and petals as in the male but larger. *Glands* of disk ribbon-like, recurved. *Staminodes* 5, united at the base into a membranous cup. *Gynophore* short. *Ovary* elongate, ovoid; style short; stigma large, capitate, 3 lobed. *Fruit* scarlet, 2·5 by 1·25 in., on carpophore about ·6 in. long, capsular, 3 valved. *Seeds* many, flat; testa reticulate; aril sweetish.

KHASI HILLS 3-5,500 ft.

Flrs. 7. Fr. 8.

*Modorcea cardiophylla* Mast. —A glabrous climber. *Leaves* 6-8 by 4-5 in., ovate-cordate, acute or shortly acuminate, entire, rarely palmately lobed, membranous; petiole 2-3 in. long with a sessile gland on either side of the apex. *Peduncles* about as long as the petioles, bearing many flowered cymes, one branch cirrhose. *Male flrs.* ·12 in. across. *Petals* 5, springing from about the middle of the calyx tube; anthers obtuse. *Female flower* larger. *Staminodes* cohering in a membranous tube towards the base. *Ovary* on a short gynophore; stigma large, peltate with 3 wedge-shaped lacinate lobes.

KHASI MOUNTAINS & ASSAM—Masters; above Barapani, KHASI HILLS.

Flrs. 6-7. Fr. 8.

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## FAM. 63. CUCURBITACEÆ.

Climbing or prostrate herbs or shrubs. tendrils mostly present, spirally coiled. *Leaves* alternate, simple, lobed or pedately divided. *Flowers* unisexual, monoecious or dioecious, solitary, axillary or in cymes or racemose. yellow or white, regular. *Calyx* limb rotate, tubular or campanulate, lobes imbricate or open. *Petals* 5, united in a tube or nearly or quite free, sometimes with fimbriated margins, imbricate or induplicate-valvate in bud. *Male flowers* :— *Stamens* inserted at various levels in the calyx-tube, free or variously united, mostly 3, rarely 1-5, one anther usually 1-celled and the others 2-celled; anther cells straight, flexuous or conduplicate, extrorse, the connective sometimes produced beyond pistil-lobes, sometimes present. *Female flowers* :— *Calyx-tube* usually wholly adnate to the ovary and sometimes produced beyond. *Ovary* usually inferior, 3 carpellary placenta parietal which often intrude in the middle and filled the ovary and thus make it spuriously 3-celled; ovules numerous, rarely few; style 1 with 3 thick stigmas, rarely styles 2-4. *Fruit* generally baccate and fleshy or finally with a hard rind, indehiscent or dehiscing by valves or circumsciss, the seeds often packed in pulp or fibre. *Seeds* many, compressed; testa often corrugated or margined, exalbuminous.

### I. Flowers white :—

- A. Petals free nearly to the base. . .  
fimbriate

Seeds 6; calyx tube over 3 in.

long. . . . .

Seeds many; calyx tube under 3 in.

long. . . . .

- B. Corolla campanulate, divided half way  
down, lobes not fimbriate. . . . .

1. *Hodgsonia*.

2. *Trichosanthes*.

*Cephalandra*.

### II. Flowers yellow :—

*Stamens* 5, anthers 1-celled, straight. . .

*Stamens* 3, anthers conduplicate or  
horse shoe-shaped. . . . .

*Thladiantha*.

*Momordica*.

## 1. HODGSONIA Hk. f. &amp; T.

**Hodgsonia hiteroclita** Hk. f. & T. Vern. *Til-lau*. Mech.; *Thi-be*, Garo; *Darsani*, Ghinphal, Nep.; *Hanthar-angphar*, Mik.; *Mei-soh-mynthar*, Kh.; *Tatar-riube*, Miri; *Thebou-lata*, *Tapouguti*, Ass.; *Thaibai doukha*, Kach.; *Hokta*, Sylh.; *Kathai*, Manip.; *Kha-um*, Lush.; *Khankra*, Cach.

An extensive woody climber with extremely bitter bark. *Leaves* 6-9·5 in. across, each way deeply 3-5 lobed, glabrous, coriaceous; lobes entire or sparingly, denticulate, sharply short acuminate or acute; petiole up to 3 in. long; tendrils 2-3 fid from the top, 5-10 in. long. *Flowers* large, diœcious, buds brown tomentose, males in elongate stout racemes up to 10 in. long, brown tomentose when young; bracts ·5 in. long, oblong, entire, acute, deciduous. *Female flowers* solitary. *Calyx* long, tubular, mouth shortly campanulate, brown tomentose outside; tube 3-4, mouth ·4-·5 in. across, teeth 5, short. *Petals* 5, about 2 in. long, connate at the base, long, fimbriate, 4 in. long, and 3 nerved outside, brown villous, white, tinged with yellow within. *Stamens* 3; filaments very short; anthers exserted, linear, connate, cells conduplicate. *Ovary* globose; stigmas 3, oblong, bifid, exserted, placenta parietal near the base of the ovary. *Fruit* 4-6 in. wide, depressed, globose, red brown, closely tomentose, 12 grooved, flesh hard, extremely bitter; perfect seeds usually six, each usually having a barren one attached to its side, flat, ellipsoid, with sunk veins, 2-3 by 1-1·5 in.

Throughout the province ascending to 3,000 ft., in the hills.

The kernel of the seeds is eaten after roasting. Silk worms are fed on the leaves.

Fls. 2-3. Fr. 11?

## 2. TRICHOSANTHES Linn.

Herbaceous or woody climbers. *Leaves* entire or 3-9 lobed, more or less toothed, tendrils usually 2-5 fid. *Flowers* usually diœcious, less often monœcious. *Males* usually in peduncled racemes with a solitary male less often female flowers from the same axil or female flowers solitary. *Calyx* tubular, dilated towards the top; teeth 5, lanceolate, entire or laciniate. *Petals* 5, connate at the base, lobes long, fimbriate.



*Stamens* 3; anthers usually connate. *Ovary* inferior; style filiform, 3-6 fid at the apex; placentas 3, parietal; ovules many. *Fruit* lanceolate or globose, smooth, seeds many, compressed, packed in pulp, sometimes angular on the margin.

**1. *Trichosanthes palmata* Roxb.** Vern. *U-soh-Iyn-shang*, Khasi.

An extensive climber, often forming dense masses, stems woody below, with pale grey bark spotted with rows of circular lenticels. *Tendrils* 3, less often 2 fid, 1-2 in. up to the fork. *Leaves* 3-7 in. across, slightly longer or as long, variable, usually palmately 3-7 lobed, 3 nerved outer, forked, close to the base; lobes acuminate or acute, nerves often ending in teeth, dark green with deep pits when fresh and rough with raised cystoliths above, lower surface paler and with cystoliths on the nerves when dry, glabrous or puberulous on the nerves; base deeply cordate; petiole 1-3 in. long, striate, puberulous or ultimately glabrous. *Flowers* 1.5-2.5 in. across; male flowers in elongate racemes, 6-12 in. long, sometimes a solitary flowers from the same axil; bracts leafy, 1-1.5 in. long, broadly obovate, many nerved, fimbriate. *Calyx-tube* up to 1.5 in. long; lobes caudate, lanceolate, sometimes toothed or subpinnatifid. *Petals* 1 in. long, cuneate, long, fimbriate. *Female* flowers on short peduncles. *Fruit* 1.5-2 in. across, ellipsoid or globose, at first red with orange streaks, ultimately deep red; pericarp thick, tough. *Seeds* numerous, reddish-brown not margined, packed in greyish green pulp.

All over the area up to 6,000 ft.

Flrs. 7-9. Fr. 10-11.

**Var. *laciniosa* Wall.** -Leaves lobed nearly to the base, segments narrow, toothed and sometimes pinnatifid.

KHASI HILLS -up to 6,500 ft.

***Trichosanthes Wallichiana* Wight.**—An extensive herbaceous climber; tendrils 3. *Leaves* 3-7 in. across, digitately 5-7 partite, sometimes close to the base, the outermost segments also often lobed or angled; segments very variable in outline, more or less lanceolate to linear-lanceolate, acuminate, nervules usually excurrent into distant teeth or irregularly pinnatifid, basal nerves 3, outer pair strongly forked

from nearly the base, both surfaces with cystoliths as in *T. palmata*, petiole 1-3 in. long, striate. *Flowers* white, 1.5-2.5 in. across. *Male* flowers in elongate axillary racemes up to 14 in. long; with often a solitary flower from the same axil. *Bracts* leafy, about 1 in. long or longer (?), broadly obovate, fimbriate, many nerved. *Calyx-tube* about 1 in. long; lobes lanceolate, caudate-acuminate. *Petals* long, fimbriate. *Female* flowers on short peduncles. *Fruit* as in *To palmata* (?).

KHASI HILLS 4,500-6,500 ft.

Flrs. 7-9. Fr. 10-11.

Probably only a variety of *T. palmata*.

### **Trichosanthes multiloba** Miq.

An extensive climber. *Tendrils* 2-3 fid. *Leaves* 3-6 in. across, 3-9 usually 5 lobed, about half way down; segments somewhat narrowed towards the base, glabrous or scabrous with scattered bristly hairs on the nerves and cystoliths (at least when dry); base subcordate, lobes toothed; petiole 1-3 in. long. *Flowers* diœcious. *Male peduncles* paired, the racemed one about 6 in. long (or in some varieties longer). *Bracts* deeply toothed. *Calyx-tube* 1-2.5 in., teeth lanceolate, subulate, entire. *Fruit* bright red with orange stripes, 2-4 in., ovoid or oblong acute; seeds .6-.8 in. long, more or less angular on the margins

KHASI HILLS 2-6,000 ft.

Scarcely more than a variety of the last species. In some forms the leaves are very large.

### **Trichosanthes cordata** Roxb.

An extensive climber. *Leaves* 6-8 in. across, ovate-cordate in outline, entire, angled or obscurely lobed, dentate-serrate. *Flowers* diœcious; bracts obovate, pubescent, entire or scarcely serrate. *Male peduncles* paired, the racemed one stout, up to 8 in. long. *Calyx-tube* 1.5 in. long, densely pubescent outside. *Fruit* globose, similar to those of *T. palmata*; seeds .5 in. long, scarcely angled on the margins.

KHASI HILLS, CACHAR- C. B. Clarke, probably throughout the province.

### **Trichosanthes truncata** C. B. Clarke.

An extensive herbaceous climber, tendrils 2-3 hu. *Leaves* 4.5-5 by 2.5-3 in., ovate acuminate; base rounded or truncate (never sometimes subpeltate, distantly denticulate or entire, glabrous; flowers thinly coriaceous, cordate); petiole up to 1.7 in. long. *Male flowers* white, solitary in leaf axils or in peduncled cymes; peduncles 2-6 in. long; bracts narrowed at the base not sheathing. *Calyx-tube* tomentose outside, about .75 in. long (.75-1.5 in. according to F. B. I.); lobes reflexed, linear lanceolate.

Female plant not seen.

Mamloo—KHASI HILLS, 4,500 ft.

Flrs. 9-10.

**Trichosanthes dioica** Roxb. Vern. *Potol*, Beng., Ass., Sans., *Parwal*, Hind.—A climber with perennial rootstock with scabrous and more or less woody stems. *Leaves* about 3 by 2 in., ovate-oblong, cordate, acute, sinuate dentate, not lobed, nor angled, rough on both surfaces; petiole .75 in. long. *Male peduncles* paired but not racemed, male flowers woolly outside. *Calyx-tube* about 1.75 in. long, narrow, lobes erect, anthers free. *Fruit* 1.5-3 in., oblong or nearly spherical, often with light green stripes, red when ripe. *Seeds* half ellipsoid, corrugate on the margins.

The wild form in submontane tracts has often bitter fruit. The fruit of cultivated form is a very wholesome vegetable and sometimes 4.5 in in length in some races. The fruits are medicinal.

Flrs. hot season Fr. rainy season

**Trichosanthes anguina** Linn Vern. *Chichinga*, *Chichunda*, Beng. The snake gourd. A large climbing herb with suborbicular often 5 lobed or angled leaves and long elongate cylindric, sometimes contorted fruits, pointed at either end and 1-3 ft. long, at first glaucous green, streaked with white, ultimately bright orange.

Sometimes cultivated for the fruits which are used as vegetable.

Fr. rainy season

#### CEPHALANDRA Schrader.

**Cephalandra indica** Naud. Syn. *Coccinia indica*, W. & A. Vern. *Bumbadhar*, Sans.; *Talakucha*, Beng. *Kundru*, Hin. A perennial with tuberous roots. *Leaves* 1.5-4 in across, 3-5 angled or lobed, cordate, marked with numerous disks and more or less rough above; petiole .5-1.5 in. long. *Flowers* white, male peduncle .7-1.5 in. long, 1-flowered; female peduncle short. *Calyx-tube* campanulate, short, limb 5-lobed. *Corolla* about 1 in. long, campanulate, 5-lobed,  $\frac{1}{2}$  way down, lobes papillosely hairy within. *Ovary* smooth. *Fruit* 1-2 in. long, ovoid or oblong, beaked, red when ripe, marked with white or greenish stripes; seeds many.

Common in hedges.

The fruit is eaten, the plant is also used medicinally.

Flrs. hot and end of rainy season.

#### THLADIANTHA Bunge.

**Thladiantha calcarata** C. B. Clarke. Syn. *T. dubia* F. B. I.

A large climber with sulcate pubescent branches. *Leaves* 3-4 by 2.2-7 in., deeply cordate-ovate, neither angled nor lobed, acute or shortly acuminate, denticulate, somewhat rough above with cystoliths tipped with sharp points, villous beneath, basal nerves 3-5; petiole about 1.7-2.2 in. long. *Tendrils* usually simple. *Flowers* about 1.5 in. across, golden yellow, diœcious; male peduncles often paired, one 1-flowered, ebracteate, caducous, the other racemed with inciso-

serrate bracts, .6-.7 in. long. *Calyx-tube* short, campanulate, the bottom shut by a horizontal scale. *Corolla* campanulate, 5-partite, the lobes revolute. *Stamens* 5; anthers one celled, straight. *Ovary* woolly when young. *Fruit* 1.5 in. long, oblong, glabrous, fleshy with many seeds.

KHASI HILLS, 4-5,000 ft., Mann.

Flrs. rainy season. Fr. cold season.

***Thladiantha Hookeri*** C. B. Clarke. —Large climber with sulcate branches. *Leaves* 3-4 in. long, acute or acuminate, polymorphic, simple and ovate-cordate to digitately tripartite with oblique lateral segments, often aurigled at the outer edge, membranous and hispidulous on both surfaces. *Tendrils* simple. *Flowers* golden yellow; male peduncles in pairs, both one flowered and racemed, one ebracteate with lax pedicels. *Petals* .5-.6 in. long. *Fruit* about 1.25 in. long, oblong.

KHASI HILLS—Mann. ASSAM—Griffith.

### MOMORDICA Linn.

#### ***Momordica dioica*** Roxb.

Perennial climber with tuberous root, stems slender. *Leaves* 1.5-4 in. long, cordate, ovate, acute more or less 3-5 lobed, distantly denticulate, glabrous, punctate beneath; petiole 1-2 in. long. *Flowers* large, dioecious, yellow, male peduncles 1.5-6 in. long, 1-flowered with a persistent hooding pubescent bract, .5-.7 in. across, embracing the flower. *Female peduncle* nearly as long as the male with a small bract below the middle. *Calyx-tube* short, campanulate; lobes linear lanceolate, acute. *Corolla* 6-partite nearly to the base; lobes .5-1 in. long, prominently veined. *Stamens* 3; anther cells horse shoe-shaped. *Ovary* clothed with long soft papillæ. *Fruit* 1-3 in. long, shortly beaked, densely covered with soft spines; seeds many.

KHASI HILLS, 5,000 ft., Mann, probably throughout the plains. The young fruit is eaten in curries.

Flrs. rainy season.

***Momordica Charantia*** Linn. Vern. *Karala*, Beng.: *Karela*, Hin.: *Tita karela*, Ass.—A short climber. *Leaves* 1-3 in. across, deeply 5-7 lobed; lobes lobulate or sinuate-dentate. *Flowers* monœcious, yellow. *Fruit* 1.5 in. long, tapering at both ends, longitudinally ribbed with rows of triangular tubercles, fleshy but dehiscent; seeds immersed in bright red pulp.

Cultivated and sometimes apparently wild.

The bitter fruits are largely used as vegetable.

***Momordica cochinchinensis*** Spreng. Vern. *Kankrol*, Beng.; *Bhat karela*, Ass.

A large climber with perennial rootstock and tuberous root.

*Leaves* 4-5 in. across, suborbicular in outline, usually 3-lobed, glabrous or nearly so, firm, punctate beneath. *Flowers* dioecious, large, whitish. *Fruit* 3-5 in. long, ovate or oblong, covered with conical points, bright red when ripe.

Cultivated and often apparently wild.

The tender fruits are much esteemed as vegetable.

Fls. & Fr. hot and rainy season.

**Zehneria umbellata** Thw. Vern. *Soh-khia-phlang*, Kh.

A herbaceous climber with angular glabrous stem; tendril climbing. *Leaves* usually hastate, narrow-lobed, polymorphous, 4-6 in. long; acute or acuminate, chartaceous, beneath. *Flowers* dioecious, small, dull white; male corymbose. *Calyx* teeth 5, small. *Corolla* lobes 5, triangular. *Stamens* 3, the female solitary. *Ovary* narrow-oblong; style cylindric. *Fruit* globose. *Seeds* small, obovate, smooth.

KHASI HILLS, GARO HILLS, 1-4,000 ft.

Fls. 3. Fr. 9.

**Gynostemma pedata** Bl.

A herbaceous slender climber; tendrils simple. *Leaves* usually pedately 3-foliolate. *Leaflets* vine-like, ovate-lanceolate, usually oblique, crenate-serrate. *Flowers* minute, in diffuse long, axillary panicles; branchlets not pubescent. *Calyx* white, 5-partite. *Corolla* lobes lanceolate. *Stamens* 5, inserted at the bottom of the calyx. *Ovary* spherical. *Fruit* globose; berry greenish.

KHASI HILLS, 3,000 ft.

Fls. & Fr. 8-9.

The following are also cultivated.

1. **Luffa ægyptiaca** Mill. Vern. *Dhundul*, Hind.; *Ghiyatori*, Bhol, Ass. Large climber; leaves reniform, orbicular, 5-angled or lobed, about 4 in. across. *Flowers* monoecious, yellow on long peduncles. *Fruit* 5-12 in. long, smooth, ultimately filled with fibre and 3-celled inside, circumcised at the top.

The young fruit is esteemed as a vegetable and the fibres are used as a flesh brush. Sometimes apparently wild.

2. **Luffa acutangula** Roxb. Vern. *Jhinga*, Beng., Ass.; *Tori* Hind. Very similar to the above but the fruit is acutely 10-ridged and the seeds are more prominently tubercled. The young fruit is esteemed as a vegetable.

**Var. amara** Clarke. *Leaves* smaller, ribs of fruit not so sharp; seeds smaller.

The fruit is intensely bitter and emetic.

3. **Benincasa cerifera** Savi. Vern. *Chalkumra*, Beng.—A large climber with hispid stem. *Leaves* 4-6 in. across, reniform, orbicular, more or less 5 lobed or angled, cordate, hispid beneath. *Flowers*

large, yellow, monœcious. *Fruit* 1-1.5 ft. long, oblong, hairy when young, ultimately covered with a waxy bloom.

4. *Cucumis melo* Linn. Var. *ultissimus* Duthie, Vern. *Kankur*, Beng. An annual with orbicular reniform 5 angled or lobed leaves about 3 in. across, rough on both surfaces. *Flowers* yellow, monœcious. *Fruit* fleshy cylindrical to elongate or contorted, often quite long.

Var. *Momordica* Duthie. Vern. *Phuti*, Beng.—*Fruit* 1-2 ft. by 3-6 in., cylindrical to oblong, bursting spontaneously when ripe.

5. *Cucumis sativus* Linn. The cucumber. Vern. *Sasha*, Beng.; *Khira*, Tiyanish, Hind.

6. *Citrullus vulgaris* Schrad. The water melon. Vern. *Tormuj*, Beng.; *Tarbuza*, *Kharmuja*, Hind.

Cultivated along sandy banks of rivers.

7. *Lagenaria vulgaris* Ser. The bottle gourd. Vern. *Lau*, *Panilau*, Beng. A softly pubescent climber with large bottle or dumbbell-shaped fruits.

Largely cultivated throughout the area for the fruits.

The dried shell of the fruit is much used for holding water.

8. *Cucurbita moschata* Duchesne. The musk melon. Vern. *Kumra*, Beng.; *Lal-kumra*, *Mitha-lau*, Ass.; *Mitha-kadu*, *Kadu*, Hin.

Extensively cultivated as a rainy season vegetable. The indumentum on the leaves is even the calyx lobes of the female flowers have usually foliaceous tip or are spatulate and fruiting peduncle is slightly expanded below the fruit. The flesh of the fruit is reddish and has a faint musk-like scent.

9. *Cucurbita Pepo* DC. Vern. *Kumra*, Beng.; *Pathao*, Kh.

A more hispid plant than the last; the petiole is pubescent and has also rigid prickly hairs, the calyx lobes are subulate; the fruiting peduncle is grooved and the flesh of the fruit is pale and not scented.

Often grown in hilly districts.

10. *Sechium edule* S. W. Vern. *Chayote* or *Chocho*, *Soh-kwash*, Khasi; *Quash*, *Eskoch* (Beng., probably from Eng. squash). An extensive climber with perennial rootstock. *Flowers* yellow, monœcious. *Fruit* pyriform, up to 4.5 in. long, with distant soft spines containing one large seed.

A native of Tropical America. Cultivated very commonly in the KHASI HILLS, where in certain season it is the most plentiful vegetable.

Flrs. and Fr. 7-11.

## FAM. 64. BEGONIACEÆ.

Mostly perennial herbs with thick rhizome or tuber, several climb by aid of roots like ivy: may be cultivated for handsome flowers and foliage. *Leaves* radical or alternate, more or less inequilateral, entire, lobed or digitately partite, usually toothed; stipules 2, large, often deciduous. *Flowers* showy, unsymmetrical, monœcious, in axillary peduncles, bracteate at base, divided above in dichotomous cymes; bracts and bracteoles opposite. *Male flowers*: perianth segments petaloid, usually 2, outer pair valvate. *Stamens* numerous: filaments free or connate in a bundle; anthers linear oblong or clavate. *Female flowers*: perianth segments 2-5. *Ovary* inferior, 2-4-celled (usually 3); style 2-4, free or connate at the base; ovules numerous, placental axile. *Fruit* capsular, usually winged, usually loculicidally dehiscent or breaking up irregularly. *Seeds* minute; albumen scanty or 0.

Placentas 2-nd :—

Fruit more or less fleshy (not dehiscent  
on the faces) 4-celled :—

  Anthers narrowly oblong : —

    Connective slightly produced.                   ..   1. *B. Roxburghii*.

Capsule 2-celled, compressed : —

  Anthers obovoid : —

    Connective produced above the anther  
    cells.                   ..           ..           ..   2. *B. laciniata*.

This family is of no forest importance but very widely represented in the province. Few species are only described below. Many are cultivated.

### 1. *Begonia Roxburghii* A. DC. Prodr.

A stout succulent plant, root fibrous. *Leaves* 6-12 by 4-8 in., ovate acuminate, irregularly toothed, glabrous or minutely pubescent on the nerves, very obliquely cordate at

base and unequal, strongly nerved; petiole 3-9 in. long. *Flowers* fragrant. *Ovary* 4-celled.

KHASI HILLS, 4,000 ft.

Flrs. 7.

## 2. *Begonia laciniata* Roxb.

Stem 6-24 in. long, brownish. *Leaves* 3-8 by 2-6 in., acutely lobed; lobes caudate-acuminate, ciliate, distantly serrate, softly pubescent; base shallowly cordate; petiole 2-4 in. long, brownish tomentose; stipules persistent, pubescent, outer perianth segments pinkish, connective produced above the anther cells. *Fruit* 1 by .5 in., pinkish, 3 winged, the posterior being much larger than the others; 2-celled.

KHASI HILLS, 4-6,000 ft.

Flrs. 8-9. Fr. Cold season.

***Begonia Josephi*** A. DC. A variable herb usually stemless. *Leaves* petiole, ovate, lobed, crenulate. *Flowers* whitish or rose purplish. *Capsule* 3-winged, one wing much the larger.

KHASI HILLS, 3-4,000 ft.

Flrs. 8-9. Fr. Cold season.

***Begonia pieta*** Sm. Exot. Bot. A herb. *Leaves* ovate, acuminate, somewhat cordate, doubly serrate. *Ovary* and young capsule very pubescent. *Capsule* 3-celled, triquetrous with one wing more elongated.

KHASI HILLS, 3-4,000 ft.

Flrs. & Fr. 7-8.

***Begonia Thomsonii*** A. DC. A caulescent hairy herb. *Leaves* ovate, usually acuminate, somewhat cordate and oblique, hispid ciliate; petioles densely rusty-pubescent. *Capsule* hairy with a descending wing.

KHASI HILLS, 3-4,000 ft.

Flrs. 8. Fr. 10.

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## FAM. 65. DATISCACEÆ.

Trees or herbs. *Leaves* simple or pinnate, exstipulate. *Flowers* small, diœcious, apetalous, racemed or paniced or clustered. *Male flowers*: *Calyx-tube* short, teeth 3-9; petals 0. *Stamens* 4-25; pistillode sometimes present. *Female flowers*: *Calyx-tube* adnate to the ovary, lobes 3-8, short; ovary 1-celled, closed or open at the top, placenta parietal; styles as many as placenta, simple or 2 partite; ovules numerous, ascending or horizontal. *Capsules* coriaceous or membranous, opening at the apex between the styles. *Seeds* numerous, albuminous.

### 1. TETrameLES R Br

**Tetrameles nudiflora** R. Br. Vern *Pagarang*, *Pak-arong*, Mik.; *Bolam*, *Mech.*; *Dieng sharei*, *Dieng-sarapi*, *Dieng-Taro*, Kh.; *Bong-lep*, Kach.; *Telo*, *Tula*, Cach.; *Thing-dol*, Lushai, Tipp.; *Oang-phop*, Manip.; *Bhelu*, *Dubong*, Ass.; *Bol-bok*, *Dumbong*, *Awek*, Garo; *Dol-theng*, Kuki; *Chamchola*, Beng. (?).

A very tall deciduous tree, branched very high up, usually buttressed near the base. *Bark* smooth, greyish or greyish-white, spongy, marked with horizontal wrinkles and small lines of lenticels peeling off in thin papery layers about 1 in. thick. *Leaves* 3.5-6 by 2.7-5.5 in., broadly or sub-orbicular ovate acuminate, irregularly toothed, 5-7 nerved, bright green and thinly pubescent or glabrate above, (at least when mature), paler and softly pubescent on the nerves beneath; lateral nerves 3-5 on either side above the basal; base cordate; petiole 2-4 in. long, terete, softly pubescent. *Flowers* diœcious appearing before the leaves in many flowered pubescent racemes or panicles at the ends of branches or axils of fallen leaves, small, yellow. *Male flowers* subsessile, in fasciculate panicles 6-10 in. long. *Calyx-tube* very short, lobes 4, sometimes with an interposed small tooth equal or unequal, linear oblong, subacute, glabrous, exceeding the tube. *Petals* 0. *Stamens* 4, opposite the calyx lobes,

inserted round a flat central disk, exserted; anthers small. *Pistillode* 0, quadrangular. *Female flowers* sessile or nearly so in numerous pendulous spicate, sometimes branched racemes. *Calyx-tube* adnate to the ovary; limb urceolate pubescent outside; teeth 4, short, triangular, acute. *Ovary* 1-celled, 8-ribbed; ovules numerous on 4 parietal placentæ; styles 4, subulate, exserted, persistent; stigmas clavate. *Capsule* 2·25 in. long, urceolate or obovoid, dotted with minute glands outside, 8 ribbed, truncate at the apex, walls membranous, dehiscing between the styles. *Seeds* minute, numerous.

Throughout ASSAM ascending to nearly 2,000 ft.

Wood white, soft, very light, pores large. Used at present for matches.

Flrs. 2-3. Fr. 5 (?).

## FAM. 66. CACTACEÆ.

Succulent plants, stems of various shapes, columnar club-shaped, spherical, compressed, angled etc. *Leaves* rarely well developed, usually reduced to scales in the axils of which are cushions known areoles on which are borne tufts of hairs or spines. *Flowers* usually solitary and axillary on the areoles or terminal between tubercles on the stem. *Perianth* usually regular, rarely somewhat zygomorphic of many whorls which are united and tubular at the base, superior. *Stamens* numerous, inserted usually on the perianth tube. *Ovary* inferior, 1-celled, with several intruded placentæ; styles and stigmas as many as the placentæ. *Fruit* generally baccate, 1-celled; seeds many.

### 1. OPUNTIA

*Opuntia monacantha* Haw. Prickly pear. Vern. *Phanimanasha*, Beng., Hind.; *Nagphan*, *Hagar-phana*, Ass.

A large succulent shrub with dark green spiny joints, branched from near the base. *Joints* obovate or oblong,

much compressed. *Leaves* caducous, .2 in. long, lanceolate, brown, terete in section, areoles with dense pale brown shining bristly usually multicelled hairs up to .2 in. long and 1-3 spines of which one is usually larger than others and attains 2 in.; the largest spine and less often a smaller one is persistent and the rest deciduous. *Flowers* 2.2-5 in. long and 3 in. across, yellow or only reddish outside. *Perianth* rotate, outer segments short, ovate-acute, inner spatulate, acute. *Stamens* yellow, short. *Pistil* longer than the *stamens*. *Berry* pyriform, truncate with a deep obconic depression at the apex and areoles with tufts of brown minutely barbed bristles.

Planted in hedges and apparently run wild near villages up to 4,900 ft. in KHASI HILLS (Shillong).

The fruit is edible but is not relished.

Flrs. hot season.

**Opuntia Dillenii** Haw. Prickly pear. Vern. *Nag-pheni*, Beng.

A straggling shrub, with grey green or bluish green, oblanceolate or obovate joints; margins entire, lower joints often corky. *Areoles* with 4-6 thorny, sometimes stout spines and numerous barbed bristles. *Flowers* sulphur-yellow-orange. *Perianth* white. *Berry* pyriform, depressed at the apex bearing tufts of barbed bristles, deep purple when ripe.

KHASI HILLS, 5,000 ft

Frs & Fr. 7-9.

### AIZOACEÆ (Ficoideæ).

Herbs. *Leaves* simple, often fleshy; sometimes falsely whorled; stipules scarious or absent. *Flowers* usually in cymes or fascicles, regular, bisexual or polygamous (rarely). *Calyx* segments 4-5, free or rarely adnate to the ovary. *Petals* usually absent. *Stamens* 5 or indefinite; filaments usually connate at base; anthers 2-celled. *Ovary* 3-5-celled; ovules numerous. *Fruit* ovate, membranous, circumscissile capsule. *Seeds* reniform.

### MOLLUGO Linn.

Branching often dichotomous, herb. *Calyx* deeply 5-partite. *Petals* 0. *Stamens* hypogynous. *Fruit* syncarpous. *Capsule* 3-5-celled, loculicidal. *Seed* sometimes appendaged.

**Mollugo pentaphylla** Linn. (*M. stricta* Linn) Vern. *Khet-papra*, Beng.

An erect slender glabrous herb. *Leaves* very variable. *Inflores-*

scence in compound terminal cymes. *Seeds* not appendaged at the hilum.

KHASI HILLS, 3-4,000 ft.

Flrs. 6.

*M. lotoides* Okze. (*M. hirta* Thunb.).

A stellately haired prostrate herb. *Leaves* usually almost orbicular. *Inflorescence* in axillary clusters. *Flowers* scssile. *Seed* with a membranous scale with a long curved bristle.

SIBSAGAR. ♀

Flrs. 3.

*M. oppositifolia* Linn. (*M. Spergula* Linn.).

A slender prostrate herb, glabrous or almost glabrous. *Flowers* pedicelled. *Seeds* with a short bristle.

CACHAR.

Flrs. 4.

## FAM. 67. UMBELLIFERÆ.

Herbs (rarely shrubs or trees). *Leaves* usually alternate, simple or compound; petiole generally sheathing at the base. stipules usually 0. *Flowers* regular or irregular, hermaphrodite or polygamous, in simple or compound umbels, rarely in heads or whorls. The peripheral flowers sometimes rayed; umbels and unbellules each furnished with bracts or bracteoles or one or both naked. *Calyx-tube* adnate to the ovary, teeth 5 or 0. *Petals* 5, epigynous, sometimes unequal, often 2-fid with a median fold and inflexed apex, usually imbricate in bud. *Stamens* 5, epigynous, alternating with the petals; anthers versatile. *Ovary* inferior, 2-celled, crowned by the disc; ovules solitary, pendulous, anatropous; style 2, often dilated at the base into stylopods; stigmas capitellate. *Fruit* of 2 indehiscent dorsal or laterally compressed carpels (pericarps) separated by a commissure and attached to and often pendulous from a slender forked axis (carpophore); the

pericarps usually marked by 5 longitudinal ridges; and often traversed by oil canals (vittæ). Seed solitary in each carpel, pendulous; testa thin; albumen cartilaginous; embryo minute near hilum, radicle superior.

A very large family of no forest importance, but extensively represented in the province and contains many common economic plants namely :—

**Carum copticum** Benth., Vern. *Aiowan*, Hind.; *Jamain*, Sans., *Jowan*, Beng.

**Coriandrum sativum** Linn., Vern. *Dhonya*, Hind.; *Dhane*, Beng.

**Cuminum Cyminum** Linn., Vern. *Zira*, Beng.

**Foeniculum vulgare** Gartn., Vern. *Sonf*, Hind.; *Mohri*, Beng.; *Madhurica*, Sans.

**Daucus Carota** Linn., The carrot. *Gazar*.

**Apium graveolens** Linn., *Celery*.

**Anethum Sowa** Roxb. *Dill*.

Umbels simple :—

Carpophore 0 :—

Leaves undivided. . . . . 1. **Hydrocotyle**.

Leaves spinous toothed. . . . . 2. **Eryngium**.

Leaves 3-5 partite. . . . . 3. **Sanicula**.

Umbels compound :—

Fruit laterally compressed :

Leaves entire :—

Flowers yellow or lurid. . . . . 4. **Bupleurum**.

Leaves usually pinnate or decomposed :—

Flowers white. . . . . 5. **Carum**.

Fruit widest at the commissure, circular or somewhat dorsally compressed in section, primary ridges distinct :—

Fruit globose, ridges prominent, carpophore 2-fid or entire. . . . . 6. **Seseli**.

Fruit ellipsoid or longer than broad, lateral primary ridges large, triangular, corky; carpophore 0. . . . . 7. **Cenanthe**.

Fruit ovoid or subquadrate; lateral primary ridges winged, corky or papery, dorsal and intermediate ridges approximate; carpophore slender. . . . . 8. **Selinum**.

Fruit much dorsally compressed, the mericarps flattened, the lateral ridges winged :—  
Petals not radiant. Ovary glabrous. . . . . 9. **Peucedanum**.

### 1. HYDROCOTYLE Linn.

**Hydrocotyle javanica** Thunb. Vern. *Manamuni*, Garo.

A prostrate herb, rooting at the nodes. Leaves 1-3 in. across, rather broader than long, glabrous, shining above,

cordate crenate or shallowly lobed; petiole 5-7 in. long, laxly pubescent. *Umbels* many-flowered; peduncles leaf opposed. *Petals* entire. *Fruit* .08-.1 in. across, compressed, disk-like.

K. & J. HILLS, GARO HILLS (2-6,000 ft.).

Flrs. Rainy season. Fr. 9-10.

**Hydrocotyle asiatica** Linn. Vern. *Bor-mani-muni*, Ass.; *Brahma manduki*, Beng.

A prostrate herb. *Leaves* sub-orbicular, reniform, .5-2.5 in. broad, almost glabrous except the nerves; petiole up to 5 in. long. *Petals* obtuse, imbricate; secondary ridges of fruit as distinct as primary.

SIBSAGAR.

Flrs. 4.

**Hydrocotyle rotundifolia** Roxb. Vern. *Haru-manimum*, Ass.

A diffuse prostrate herb. *Leaves* small, orbicular, cordate, lobed or sub-entire, .25-.8 in. broad, hispid; petiole 1-5 in. long. *Petals* acute, valvate; secondary ridges of fruit 0

SIBSAGAR.

Flrs. 4.

## 2. ERYNGIUM Linn.

**Eryngium foetidum** Linn. Vern. *Jongali-memedo*, Ass.; *Podomosolla*, Cach.

A very aromatic glabrous erect perennial herb. *Leaves* 2-4 by .4-1 in., spathulate, spinous-toothed. *Flowers* white in heads; bracts spinulose, stellate. *Calyx-teeth* ridged, acute. *Petals* white. *Fruit* ellipsoid. *Seed* semi-terete.

DARRANG, N. C. HILLS and K. & J. HILLS (upto 5,000 ft.).

Flrs. 5. Fr. Cold season.

## 3. SANICULA Linn.

**Sanicula europæa** Linn.

An erect herb. *Leaves* palmately 3-5-partite, glabrous. *Umbels* irregularly compound, rays few. *Flowers* mostly unisexual. *Calyx-tube* villous; teeth lanceolate. *Petals* white, emarginate. *Fruit* echinate, laterally compressed.

KHASI HILLS (3-5,000 ft.).

Flrs. 12-1. Fr. 3.

## 4. BUPLEURUM Linn.

**Bupleurum falcatum** Linn.

Soft-wooded glabrous undershrub. *Radical leaves* linear, broader upwards. *Cauline leaves* linear-lanceolate, acute, upto 5 in. long, semi-amplexicaul or sessile. *Umbels* compound. *Calyx-teeth* 0. *Petals* obovate, emarginate. *Fruit* brownish; carpels narrowly oblong, furrows 3-vittate.

KHASI HILLS (3-6,000 ft.) G. Mann.

Flrs. 6.

## 5. CARUM Linn.

**Carum khasianum** C. B. Clarke.

A pubescent erect herb 2-4 ft. *Lower leaves* 3-partite or sub-bipinnate; segments oblong, arcuate, serrate. *Umbels* compound. *Flowers* white, polygamous; bracts linear. *Fruit* ovoid, hispidulous, ridges prominent; carpels sub-pentagynous; carpophore 2-fid; vittæ solitary. *Seed* terete, dorsally subcompressed.

KHASI HILLS, 3-5,000 ft. (G. Mann).

Flrs. 6.

## 6. SESELI Linn.

**Seseli daucifolium** C. B. Clarke.

An annual erect herb. *Leaves* 2-3-pinnate, alternate segments linear or narrowly lanceolate, margins minutely serrulate. *Umbels* compound. *Flowers* white. *Calyx-teeth* obsolete. *Petals* 5, emarginate; carpels 2; style usually short. *Fruit* glabrous, globose. *Seed* semi-terete.

ASSAM (G. Mann).

## 7. CENANTHE Linn.

**Ceanothe stolonifera** Wall.

A stoloniferous herb, growing in wet places. *Leaves* 1-2 pinnate or 3 partite. *Umbels* compound, rays 6-30. *Flowers* white. *Calyx-teeth* small. *Petals* emarginate. *Fruit* subquadrate, commissure broad, lateral ridge large,

triangular corky, furrows 1-vittate; carpophore 0. *Seed* almost rounded.

KHASI HILLS up to 6,000 ft.

Flrs. 3. Fr. 10.

**Ænanthe benghalensis** Benth.

A herb growing in moist places almost glabrous, usually erect. *Leaves* pinnately 3-decompound. *Peduncles* 2.2-5 in. *Seeds* nearly rounded.

K. & J. HILLS (9458 Fisher 1879).

**Ænanthe linearis** Wall.

A straggling herb, almost glabrous; nodes often rooting. *Leaves* bipinnate. *Peduncles* about 5.5 in. long. *Seeds* almost circular.

K. & J. HILLS (9303).

There is another sheet of *Ænanthe* (Mann No. 372 K. & J. Hills 3-4,000 feet, June 1876) which appears to be intermediate between *O. hookeri* and *O. linearis*.

8. **SELINUM** Linn.

**Selinum striatum** Benth. Vern. *Jakseh*, Khasi; *Bhutkis*, Nep.

Perennial herbs, glabrous or nearly so. *Leaves* 4-8 in., oblong lanceolate, or ovate, 3-4-pinnate, upper-most sheath often exceeding the whole length of the petiole. *Fruit* dorsally compressed, ridges subequally winged; vittæ solitary. *Seeds* obscurely 2-grooved.

KHASI HILLS, 4-6,000 ft. Common.

Flrs. 6-7. Fr. Early cold season.

9. **PEUCEDANUM** Linn.

**Peucedanum ramosissimum** Wall.

Perennial glabrous herbs. *Leaves* 2-4-pinnate; segments of lower leaves ovate lanceolate of the upper narrow lanceolate. *Umbels* compound, rays usually numerous. *Calyx-teeth* minute. *Petals* obovate. *Ovary* glabrous; style very short. *Fruit* much dorsally compressed, mericarps slightly convex on the back, margin more or less acutely winged,



dorsal and intermediate ridges obscure, furrows 1-vittate, Commissure evittate.

K. and J. HILLS (46,000 ft.).

Flrs. Rainy season. Fr. 9.

**Heracleum candicans** Wall.

A large erect herb. *Stem* hollow, almost glabrous; young parts pubescent. *Leaves* bipinnate. *Leaflets* lobed, doubly serrate or crenate. *Fruit* obovate, about .4 in. long, commissure 2-vittate.

K. & J. HILLS (10576).

**Heracleum obtusifolium** Wall.

An erect herb, hairy *Leaves* 3-fid or 3-5 partite, tomentose beneath. *Fruit* obovate, .2 in. long, 4-vittate.

K. & J. HILLS 6,000 ft. (9458).

## FAM. 68. ARALIACEÆ.

Trees or shrubs, rarely herbs, erect or climbing, sometimes epiphytic. *Leaves* alternate or whorled, simple or compound; petiole usually long; stipules adnate to the petiole, sometimes conspicuous or absent. *Flowers* regular, small, sometimes polygamous, usually umbellate, less often racemose or in panicle heads; bracts and bracteoles present; pedicels sometimes jointed. *Calyx-tube* adnate to the ovary; limb truncate, obsolete or with small teeth. *Petals* 5, rarely 6-7, free or falling off in a cap. *Stamens* usually 4, alternating with the calyx lobes, rarely many, inserted round an epigynous disk. *Ovary* inferior, 2 or more celled; ovule 1 in each cell, pendulous. *Fruit* a drupe or berry; seeds pendulous, albuminous.

- I. Stamens less than 15; petals not connate;  
ovary 2-12 celled :—

A. Ovary 2-5 celled. Pedicels jointed;  
petals imbricate in bud, albumen  
uniform.                      ..                      ..                      ..

1. *Aralia*.

- B. Ovary 5 celled :—
1. Leaves not simple :—  
 Petals imbricate in bud; leaves usually pinnately compound\*; pedicels jointed. . . . . 2. **Pentapanax.**  
 Petals valvate, 5 or 6; leaves digitate; pedicels not jointed. . . . . 3. **Heptapleurum.**
  2. Leaves simple :—  
 Erect trees or shrubs; albumen uniform. . . . . 4. **Dendropanax.**  
 Evergreen creeper climbing by adventitious roots; albumen ruminant. . . . . 5. **Hedera.**
- C. Ovary 2-celled :—
1. Pedicels not jointed :—  
 Styles distinct :—  
 Unarmed trees; leaves pinnately decompound; albumen ruminant. . . . . 6. **Heteropanax.**  
 Armed trees; leaves digitate; albumen uniform. . . . . 7. **Acanthopanax.**  
 Styles united :—  
 Generally armed trees or shrubs; albumen ruminant. . . . . 8. **Brassaiopsis.**
  2. Pedicels jointed :—  
 Styles united; leaves digitate; albumen uniform. . . . . 9. **Macropanax.**
- D. Ovary 6-12 celled :—  
 Leaves palmate; flowers large; pedicels not jointed. . . . . 10. **Trevesia.**
- II. Stamens usually numerous; petals connate and falling off in a cap. Ovary of numerous cells. . . . . 11. **Tupidanthus.**

### 1. ARALIA Linn.

Herbs, shrubs, or small trees. *Leaves* digitate, pinnate or pinnately decompound; stipules not prominent. *Umbels* solitary or in racemes or panicles, rarely compound; pedicels sometimes jointed under the flowers. *Flowers* often polygamo-monœcious. *Calyx-limb* 5-toothed or truncate. *Petals* 5, ovate, imbricate in bud. *Stamens* 5. *Ovary* 2-5-celled; styles 2-5, free or shortly connate at base. *Fruit* 4-5-celled, 4-5 angular, or sub-globose, 2-3-celled.

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\* Assam species.

1. Erect shrubs. Leaves 1-3 pinnate; styles 4-5 :—
  - a. Inflorescence softly brown tomentose throughout; bracts tomentose, persistent, upto .25 in. long; pedicels tomentose. . . . . 1. *A. Thomsonii*.
  - b. Inflorescence pubescent towards the top only; pedicels hairy; bracts caducous. . . . . 2. *A. armata*.
  - c. Inflorescence and pedicels glabrous; bracts membranous, upto 1 in. long, glabrous. . . . . 3. 4. *foliosa*.
2. Herb. Leaves digitate; styles 2-3. . . . . 4. *A. pseudo-ginseng*

### 1. *Aralia Thomsonii* Seem Vern. *Dieng-sir-ah*, Kh.

Usually unbranched prickly shrub, younger parts, inflorescence, leaf rachis and leaflets softly fulvous tomentose. *Prickles* usually short, strong, weaker on pinnæ. *Leaves* large, 2-3 pinnate, with a pair of leaflets at each division of the rachis, pinnæ 4-5 pairs; leaflets 5-11 on each, pinnate, 3-5 by 1·2-3 in., ovate or ovate-lanceolate, acuminate, serrulate, often unequal, scabrid above, tomentose beneath; lateral nerves 6-10 on either side of midrib, arcuate; base subcordate or rounded; petiolules 0·1 in. long. *Umbels* paniced; panicles 18-36 in. long; umbels .6-.8 in. across. *Bracts* .2-.25 in. long, lanceolate or narrow lanceolate; bracteoles similar but smaller; pedicels .2-.4 in. long, tomentose, jointed towards the top. *Calyx* glabrate; teeth distinct. *Petals* ovate. *Style* arms 5, often 4 by fusion of two. *Fruit* .15 in. long, deeply ribbed.

GOALPARA, KHASI & JAINTIA HILLS 2-5,000 ft., Haflong - CACHAR—Craib.

Flrs. 2-6. Fr. 6-8.

### 2. *Aralia armata* Seem. Vern. *Santok-arong*. Mik.; *Thing-chuk-chu*, Kuki; *Dieng-la-tymphu*. Synt.

A shrub or a small prickly tree with large pith. *Bark* grey; blaze white. *Leaves* very large, 3-4 pinnate, often up to 7 ft. long; rachis and its ramifications armed with short prickles; primary pinnæ 6-8 pairs, secondary 3-8 pairs, sometimes with a hair of small pinnæ at the base; leaflets 5-9 on the ultimate pinnules, also often a hair at the ramifica-

tion of the rachis, 2·5-4·5 by ·7-2 in., ovate or ovate-lanceolate, acuminate, bristly serrulate; base rounded or cordate, pilose or harshly hairy with short stiff hairs; lateral petiolules very short, hairy. *Flowers* small, whitish, about ·15 in. across in extensive paniced umbels; panicles much branched (terminal), upper portion hairy; umbels up to 20-flowered; bracts caducous; pedicels roughly hairy up to ·5 in. long. *Calyx* nearly glabrous; teeth distinct. *Petals* 5, imbricate in bud. *Stamens* 5; ovary 4-5 celled; styles free, recurved. *Fruits* the size of pepper-corns, glabrous, 4-5 celled with as many stones.

CACHAR and KHASI HILLS, 2-4,000 ft.

Flrs. 11-12. Fr. 1.

### 3. *Aralia foliolosa* Seem.

A large shrub or a small tree, armed with numerous spreading prickles. *Leaves* pinnately decompose, about 5 ft. or more in length; rachis glabrous; prickles distant, up to ·3 in. long, often with a pair of leaflets at the ramifications. *Leaflets* on the ultimate pinnules 3-9, terminal largest, 3-5·5 by 1-2 in., ovate-lanceolate or oblong, acuminate or caudate-acuminate, serrulate, glabrous or with minute bristles on the nerves; base cordate or rounded; lateral petiolules short 0·15 in. long. *Panicles* very large, decompose, 1-3 ft. or more in length, pilose when young, ultimately glabrous with a few weak prickles, scattered; bracts narrow-oblong to oblong-lanceolate, up to 1 in. long; membranous, persistent; pedicels glabrous or nearly so, up to ·45 in. long, very slender with a ring of minute sets at the apical joint. *Flowers* 5-merous, about ·15 in. across, greenish. *Calyx* glabrous; teeth distinct; petals valvate, ovate. *Fruit* of 5-carpels with 5 ridges about ·15 in. long.

KHASI HILLS, Griffith 2659! Nongpoh forest. ASSAM, Jenkins.

Fr. 12.

### 4. *Aralia Pseudo-ginseng* Benth.

A herb attaining about 2·5 ft. with perennial tuberous or tuberiferous root stock. *Leaves* digitate; petiole 2-6·5 in. long. *Stem* terminated by a whorl of leaves with a deciduous

scale at the base. *Leaflets* 3-9, often 5, 4·2-7·25 by ·6-·85 in., narrowly lanceolate, acuminate, serrate, membranous, covered with scattered bristly hairs on both surfaces; lateral nerves slender, many; base tapering or rounded; petiolules 0·3 in. long. *Peduncles* glabrous or puberulous, simple or 2-4 branched, each branch terminating in an umbel; pedicels ·25-1 in. long, puberulous or pubescent, jointed below the flowers; bracteoles deciduous. *Flowers* polygamo-monœcious. *Calyx* more or less puberulous with short teeth. *Ovary* 2-3-celled; styles 2-3. *Fruit* drupaceous, ·25 in. across, black when ripe, bluntly 2-3-gonous and shallow grooved between the angles.

KHASI HILLS 5500-6500 ft. Usually in shady situations e.g. Dumptep, where it is sometimes gregarious.

Frs. 5-6. Fl. 9.

## 2. PENTAPANAX Seem.

Trees or shrubs, often scandent. *Leaves* 1-pinnate, with 3-9 leaflets, glabrous. *Flowers* bisexual, rarely polygamous, in compound racemes or umbels; pedicels jointed close under the flower. *Calyx-teeth* 5; petals 5, imbricate in bud. *Stamens* 5. *Ovary* 5 (or 4)-celled; styles 4-5 combined to the top or free or more than half the length. *Fruit* 4-5 celled or angled; albumen uniform.

### 1. Flowers in paniced racemes:—

Rachis of panicles unbranched upwards. 1. *P. subcordatum*.

Rachis of panicles bearing racemes to nearly the top. . . . . 2. *P. racemosum*.

### 2. Flowers in umbels:—

Leaflets serrate. . . . . 3. *P. Leschenaultii*.

Leaflets entire. . . . . 4. *P. parasiticum*.

**1. *Pentapanax subcordatum* Seem.** Vern. *Dieng-jariat*, *Dieng-soh-baria-um*, *Jariat-lor-mew*, *Ja-riat*, Kh.

A small tree, epiphytic at least in early life. *Bark* greyish-brown outside, exfoliating in irregular flakes, about 3 in. thick; blaze white or cream coloured. *Leaf rachis* 5-9 in. long; common petiole 3-6·5 in. long. *Leaflets* 3-5, 3·5-5 by 1·5-3·5 in., ovate, ovate-oblong or elliptic, shortly caudate-acuminate; sinuate-crenate, glabrous, sub-coriaceous;

main lateral base subcordate or subtruncate, often abruptly narrowed on the petiolule; nerves 6-10 on either half; petiolules  $\cdot 5$ - $1\cdot 7$  in. long, jointed at or near the top. *Flowers* very small, green in paniced racemes. *Panicles* terminal or from below the current year's shoots, 8-11 in. long, often with 3-8 strong ascending branches from the lower half, racemes borne on the lower portion of the main panicle branches, upper portion of rachis unbranched. *Racemes*  $1\cdot 5$ - $4$  in. long, flowering down to the bases; pedicels  $\cdot 1\cdot 2$  in. long, each with a minute linear bract at the base. *Flowers* bisexual, very small, greenish. *Styles* combined nearly to the top. *Fruits* about  $\cdot 2$  in. across, subglobose, obscurely 5 angled.

Wood white, not used.

Flrs. 5-6. Fr. 7.

## 2. *Pentapanax racemosum* Seem.

Straggling or a small erect tree. *Leaves* 12-20 in. long, pinnately 3-5 foliolate; leaflets 2-5 by  $1\cdot 2$ - $3\cdot 5$  in., ovate-acuminate, distinctly cuspidate-serrate, glabrous; main lateral nerves about 5 on either half; lateral petiolule  $\cdot 1\cdot 1$  in. long. *Flowers* unisexual, small, in terminal clustered panicles 6-9 in. long; racemes  $1\cdot 5$ - $2$  in. long, nearly to the top of the panicle branches, bractiate; pedicels  $\cdot 08$  in. long, slender. *Styles* in female flowers recurved, in male flowers combined to nearly the top. *Fruit* subglobose.

KHASI HILLS--Brandis. There is no record from our area at Calcutta.

Flrs. 6-7.

## 3. *Pentapanax Leschenaultii* Seem. Var. *umbellatum* Seem.

An unarmed small tree or subscandent shrub, sometimes epiphytic, often trailing on rocks. *Leaf rachis* 5-9 in. long; common petiole 3-6 in. long. *Leaflets* 3 or 5,  $2\cdot 5$ - $4\cdot 5$  by 1-2 in., ovate or lanceolate, sharply acuminate, bristle serrate or serrulate, rounded or subtruncate and often unequal at the base, shining above, subglaucous beneath; main lateral nerves 6-9 on either half; petiolules (of lateral leaflets)  $\cdot 2\cdot 1$

in. long, jointed near or at the apex. *Flowers* about .15 in. across, greenish, in peduncled umbels, arranged on a panicle or compound umbel, 2.5-5.5 in. long. *Umbellules* globose; peduncles .5-2 in. long. *Branches* of the inflorescence and pedicels pubescent or puberulous; pedicels slender, usually .3-.6 in. long, sometimes longer. *Bracts* deciduous, narrow-lanceolate. *Calya* glabrous; disk often conically elongated. *Fruit* about .17 in. long, oblong, sharply 5 ribbed with deep grooves between, crowned by the remains of the style.

KHASI HILLS 5-6,000 ft.

Flrs. 3-4. Fr. 7-8.

The type of the tree with fruits, without prominent ribs and umbels arranged in panicles and does not occur in our area.

#### 4. *Pentapanax parasiticum* Seem. Var. *khasianum* C. B. C.

An epiphytic subscandent shrub or small tree with smooth pale or brownish bark, often sending down stout aerial roots. *Leaves* 4-10 in. long. *Leaflets* 5; 1.5-3 in. by .7-1 in., ovate-lanceolate, entire, acuminate; base rounded or subacute, often unequal, subcoriaceous, shining above, glaucous beneath; lateral nerves very slender; lateral petiolules 0.1 in. long. *Flowers* greenish, .25 in. across in globose umbels; solitary or 2-8 together in simple panicles. *Pedicels* .3-.5 in. long, slender, pubescent. *Styles* combined to the apex. *Fruit* subglobose

KHASI HILLS—5,000 ft., rare

Flrs. 10.

***Panax fruticosum* Linn.** A shrub 3-6 ft. high with 3-pinnate leaves; leaflets 2-3 by .5-.25 in., very variable, lanceolate, bristle-serrate. Flowers very small, yellow, 5-merous in panicked umbels; bracts minute; pedicels jointed close under the flowers .12-.2 in. long. *Styles* 3, persistent, recurved. *Fruit* compressed laterally, .15 in. across.

Often cultivated as an ornamental pot plant in verandahs.

### 3. *HEPTAPLEURUM* Gærtn.

(Included in *Schefflera* Forst Section-*Heptapleurum* by Harms in *Englers Nat. Pflanzenfamilien*).

Large shrubs or trees, sometimes scandent; prickles absent. *Leaves* usually digitate, rarely 1-foliolate or twice digitate; leaflets entire or remotely toothed or sometimes lobed, coriaceous; stipules often connate within the petiole and prominent. *Flowers* often polygamous, usually 5-6, sometimes 10-merous; umbels paniced or in compound racemes; bracts woolly; pedicels not jointed under the flower; bracteoles 0 or few and caducous. *Calyx* margins toothed or truncate. *Petals* valvate, often cohering in a cap, which is raised by the stamens. *Stamens* and ovary cells as many as the petals; disk small or large; styles short or sometimes scarcely developed, connate in a broadly conical or narrow cylindric column. *Fruit* sub-globose, 5-6 angled. *Seeds* compressed; albumen uniform, rarely ruminate.

I. Fruit crowned by a narrow cylindric column:—

Leaflets polymorphous, often pinnately lobed. . . . .

Leaflets not polymorphous. . . . .

1. *H. hypoleucum*.

2. *H. elatum*.

II. Fruit crowned by a conical disk; styles very short:—

Leaflets entire:—

Nerves indistinct above on leaflets; inflorescence covered with deciduous tomentum; ridges on the fruit rounded. Leaf scars not annulate. . .

3. *H. kahasianum*.

Nerves distinct above on leaflets; inflorescence glabrous; ridges on the fruit sharp. Leaf scars annulate. . .

4. *H. venulosum*.

1. *Heptapleurum hypoleucum* Kurz. Vern. *Dieng-la-tymphu*, Synt., Kh.

A small unarmed branchy tree. *Bark* nearly smooth, brown or grey, with a soft greenish-white cut; young parts and inflorescence with deciduous brown stellate scurf. *Leaves* digitate; common petiole 12-26 in. long, swollen at the base; stipules connate with acuminate tips, brown felted outside, .3-.5 in. long. *Leaflets* polymorphic, 5-7, very variable in size, 5-15 by 1.5-12 in., central largest, usually oblong or elliptic to ovate oblong in outline, acuminate, pinnately lobed, entire or somewhat distantly serrate, glabrous with age above, undersurface paler with deciduous



scurf and stellate hairs, sometimes glabrescent with age, chartaceous; main lateral nerves 8-14 on either half; petiole 1-7 in. long, jointed and thickened at the apex. *Flowers* greenish-white, globose; umbels terminating (by the abortion of the lateral umbels) or arranged racemously on the branches of a terminal subcorymbose panicle, 10-24 in. long; terminal umbels largest, 1-5-2 in. across; lateral umbels with peduncles. *Rachis* stout; panicle branches 1-6-5 in. long; bracts at the base of the peduncles thick, concave, ovate, acuminate, densely brown-felted, gradually small upwards up to 1 in. long; bracteoles similar, but small, a few at the base of pedicels, linear; pedicels .5-.75 in. long. *Calyx* truncate. *Petals* 5, ultimately reflexed, .2-.25 in. long, oblong-acute, clothed outside with dense stellate white wool. *Stamens* 5; filaments subulate, much exceeding the petals. *Fruit* globose, .25 in. across, 5-celled, obtusely 5-ribbed, crowned by the disk and the short column of connate style, which is 5-fid at the apex; albumen ruminant.

KHASI HILLS 2-6,000 ft.

A poultice of leaves is good for swellings.

Fls. 11-1. Fr. 4.

**2. *Heptapleurum elatum* C. B. Clarke. Var. *Griffithii*, Syn. H. *glaucum* Kurz.**

A small evergreen tree; young parts and inflorescence felted with deciduous tawny floccose wool, glabrescent with age. *Leaves* digitately 5-7 foliolate; common petiole stout, 12-19 in. or longer; stipules connate, about .5 in. long. *Leaflets* variable in size, usually 5-10 by 2-5 in., elliptic to oblong or ovate, obtuse or rounded at the base, entire, acuminate or remotely serrate, coriaceous, glabrous above, at first stellate tomentose, ultimately glabrescent, but pale beneath; lateral nerves 8-12 on either half; petioles 1-3 in. long. *Flowers* small, in umbels terminating or racemously arranged on the branches of a terminal corymbose panicle, usually not exceeding the common petioles in length; bracts up to .6 in., smaller upwards, concave, ovate-acuminate, with a broad suborbicular base; bracteoles small, similar in shape; pedicels woolly, .5-.7 in. long. *Calyx* truncate. *Petals* 5, stellate-woolly outside, glabrous inside, oblong, acute, about

·2 in. long. *Styles* united in a column, distinctly 5-fid at the top. *Fruit* globose, about ·25 in. across, glabrous with age, 5 grooved, surmounted by the persistent cylindric style.

KHASI HILLS 4-6,000 ft. Mann.

The type<sup>1</sup> has usually glabrous or sparingly woolly buds, pedicels and petals. An incomplete specimen (No. 445) from an epiphyte collected at Dirju along Kananai in Lakhimpur Dist., with large leaves 9-13 by 4-7 in., elliptic-oblong, short, acuminate, entire, glabrous leaves, may be  $\frac{1}{2}$  form of the plant, but the material is too fragmentary for satisfactory determination.\*

Fr. 12

**Heptapleurum glaucum** C. B. Clarke (not of Kurz.)

A small tree with stout branchlets. *Leaves* digitately 3-7 foliolate; common petiole 8-10 in. long. *Leaflets* 3-6 by 1-3 in., lanceolate to obovate lanceolate, entire or nearly so, glabrous above, pale and floccose tomentose when young along the nerves, ultimately glabrous beneath; lateral nerves 10-12 on either half; petiolules ·8-2 in. long. *Inflorescence* scurfy tomentose; panicles branched as in *H. elatum*, 6-8 in. long; branches 1-3 in. long; umbels about 1 in. across; pedicels ·25-·4 in. long. *Calyx* and *petals* brown-woolly-tomentose outside. *Fruit* glabrous, about ·25 in. across, 5-grooved, surmounted by the persistent style.

**Jowai** King's collector! "Vale of rocks—KHASI HILLS—C. B. Clarke! Kynohi."

The plant is scarcely separable from the last species.

Flrs. 10-11. Fr. 12.

**3. Heptapleurum khasianum** C. B. Clarke. Vern. *Dieng-tampoh*, *Dieng-la-tang-king*, *Dieng-tanki*, Kh.

A small tree branched from near the base. *Bark* grey or brown, with distant warts, somewhat corky; blaze yellowish or greenish white with faint brown or green dots, darkening and soon changing to greenish-black on exposure; young shoots and inflorescence clothed with deciduous, stellate tomentum. *Leaves* digitately 7-9 foliolate; common petiole 7-10 in. long, lenticellate, usually with many close set warts at insertions; stipules connate; leaflets with a faint resinous smell, 4-9 by 1·5-3·5 in. (sometimes attaining 11 in. C. B. Clarke in F. B. I.), lanceolate or elliptic-lanceolate, acuminate, entire; glabrous, shining above, very coriaceous; main lateral nerves 10-15 on either half, joined near the margin by an

\* Since identified at Sibpur as *H. hypoleucum* Kurz.—R. N. Dc.

undulating intramarginal nerve, indistinct above; base rounded or narrowed; petiolules 1-2 in. long; umbellules up to 10 flowered, recemed on the branches of a terminal or subterminal spreading corymbose panicle, 9-12 in. long. *Panicle* branches ascending, 2.5 in. to nearly as long as the rachis; peduncles .3-.9 in. long. *Flowers* white. *Calyx* at first stellate-tomentose, ultimately glabrous, truncate; petals deciduously stellate pubescent outside, .15 in. long, usually 6, less often 7 or 8? *Stamens* as many as petals. *Fruit* .5-8 grooved, globose, .2 in. long, crowned by the conical disk. *Styles* very short, not connate into a cylindric column; albumen not ruminant.

KHASI HILLS- 46,000 ft., sometimes on rocks in shady situations, rarely epiphytic.

Fls. 12.

**4. *Heptapleurum venulosum* Seem. Syn. *Schefflera venulosa* Ham.** Vern. *Jeng-jil*, *Dorengmi*, Garo; *Dau-nasi*, Mech; *Daini-huka*, Jharua; *Jokhuni-hata*, *Dhobaulata*, *Dhovallata*, Ass.; *Dieng-meising-hat*, *Jarmi-mong-hoi*, *Dieng-soh-luait*, *Mei-soh-syrkan*, Kh.; *Tille-diyabet*, Synt

A soft wooded climber attaching itself by means of adventitious roots to supports, rarely a shrub, often epiphytic. *Bark* conspicuously lenticellate, nearly white or pale brown, thick, nearly white or pale yellow, mottled with darker yellow or orange inside; twigs stout. *Leaves* digitate; petiole terete, 4.5-12 in. long; stipules connate, .5 in. long; leaflets 3-7, .3-7.5 by 1.3-5 in., elliptic-oblong or lanceolate-acuminate, entire, coriaceous, glabrous, shining above; lateral nerves about 5-7 on either side; petiolules 1-2 in. long, jointed at the apex. *Flowers* .3 in. across, polygamous, in few flowered (up to 12) umbellules, racemosely arranged on a much branched terminal panicle; rachis purplish; peduncles of umbellules up to .5 in. long; pedicels up to .2 in. long; panicle branches 5-10 in. long; bracts caducous, woolly, enveloping the umbellules. *Calyx* truncate. *Petals* 5, obovate-oblong, acute, in male flowers sometimes cohering in a cap which is uplifted by the stamens. *Fruit* about .3 in. across, 5 ridged.

DARRANG, KAMRUP, SIBSAGAR, NOWGONG, CACHAR, GOALPARA, GARO AND KHASI HILLS—ascending to about 4,000 ft. Probably all over ASSAM.

Flrs. 3-4. Fr. 10-11?

The leaf scars persist on the twigs as nearly annulate raised lines.

The form with large leaflets has been separated under Var. *macrophylla* Wall. Cat. (sp.) in F. B. I.

**Schefflera bengalensis** Gamble Kew Bulletin 1919. P. 229.

Climbing shrub. *Leaves* digitately 5-foliolate; petioles 4-8 in. long. *Leaflets* 3-8 in. by 1.2-2.75 in., oblong to oblong-lanceolate, cuspidate-acuminate; main lateral nerves about 8-10, curved at the margin; petiolule .75-2 in. long; stipules intrapetiolar, rounded, fleshy. *Flowers* dull red in umbels on terminal panicle racemes; rachis usually stout, glabrous, 3-4 in. long; racemes 4-4.75 in. long; peduncles of umbels .4-8 in. long; pedicels slender; bracts in bud large, orbicular, floccose—puberulous, soon deciduous. *Calyx-tube* glabrous, truncate. *Corolla* falling off in a calyptra; petals about .08 in. long. *Ovary* 5-celled. *Fruit* dry, 5-angled, glabrous.

Griffith 2692 from Bhotan; KHASI HILLS and SYLHET, Hooker, Thomson and Simmons.

Allied to *Heptapleurum venulosum* Seem Var. *Roxburghii*-*Schefflera* *Roxburghii* Gamble.

#### 4. DENDROPANAX Dene and Planch.

**Dendropanax japonicum** Seem. Vern. *Dieng-sar-rated*, Synt.

A small unarmed tree with smell of as a foetida. *Bark* grey, not rough; blaze white. *Leaves* on young plants and coppice shoots deeply palmatifid with 5-8 narrow-lanceolate, entire or remotely and minutely toothed lobes, 5-10 in. across with petioles 6-15 in. in length, in older plants 3-6 by 1-2 in., elliptic-lanceolate or lanceolate, subacute to acuminate, entire, glabrous, chartaceous; lateral nerves 4-6 on either side, not prominent; petiole .5-3 in. long. *Flowers* light-green in umbels; umbels solitary or few on short terminal panicles; peduncles .5-7 in. long; pedicels not articulate, .3-5 in. long. *Calyx-limb* with 5 minute teeth or nearly entire, about .15 in. long. *Petals* 5, about .1 in. long, valvate, reflexed, thick, lanceolate to ovate. *Stamens* 5; filaments exceeding the petals. *Ovary* 5-celled; styles united at the base into a column, their summits free and spreading. *Fruit*

ellipsoid, .3-.5 in. by .25-.3 in., ribbed, 5-celled; seeds compressed; albumen uniform.

KHASI HILLS, 4,500' ft.

Flrs. 9.

**Dendropanax Listeri** King. Journ. of Asiatic Soc., Beng. Vol. XLVII, 294.

A small straggling tree up to 20 ft. in height. *Leaves* 1-foliate, 4-8 by 2-4 in., elliptic or ovate, acuminate; base cuneate with 3 strong nerves and a slender one on either side, entire or distantly cuspidate-serrate, subcoriaceous; lateral nerves 2-3 on either half above the basal, arched; petiole 1-5-9 in. long. *Panicles* terminal, pyramidal, 6-9 in. long with branches 2-6 in. long; pedicels .3-.5 in. long, slender. *Flowers* not seen. *Fruit* globose, .15-.2 in. across.

Fr. 1-2.

DAFFLA HILLS, 4500-5000 ft.

### 5. HEDERA Linn.

**Hedera Helix** Linn. The Ivy. Vern. *Mei-peosree*, *Mei-soh-poram-shre*, *Peu-shri*, *Peu-shrish*, Kh.

A large evergreen woody climber adhering to trees, rocks etc. by numerous fine rootlets. *Bark* light, nearly white or pale brown, somewhat rough, cut yellowish white. *Leaves* alternate, simple, polymorphic, usually 2-5 in. long, very variable in breadth, on flowering shoots usually entire and ovate, ovate-elliptic or lanceolate, others variously lobed, more or less triangular in outline, leathery, dark green and shining above, 3-5 nerved; nerves prominent above; base cordate, rounded or in flowering shoots narrowed or cuneate; petiole slender, .5-3.5 in. long; stipules 0. *Flowers* about .25-.4 in. across, polygamous, yellowish-green, pentamerous in pedunculate globose umbels, which are terminal, solitary or a few together in short subcorymbose panicles; .5-2 in. long; pedicels .5-.8 in. long, both clothed with minute stellate scales. *Calyx* obscurely toothed or nearly truncate. *Petals* about .12 in. long, triangular, valvate with a ridge in the centre inside, ultimately reflexed. *Ovary* 5-celled; disk broadly conical; styles connate in a short column. *Fruit* .25-.3 in. across, globose, yellow, shining when fully ripe,

with fleshy exocarp, pyrenes thin-walled; seeds 3-5, ovoid; albumen ruminate.

KHASI HILLS, 3-6,500 ft.

Flrs. 10-12. Fr. 1-6.

#### 6. HETEROPANAX Seem.

**Heteropanax fragrans** Seem. Vern. *Kainsra-asing*, *Kanjor-arong*, Mik.; *Gutang-asing*, *Galapak-asing*, Abor; *Keseru*, *Karangiya*, (Kamrup), *Koronda*, Ass.; *Ralung-bu*, Kuki; *Katebel*, Tipp.; *Bolsamphol*, *Bigasargo*, *Mugasalgo*, Garo; *Dieng-kynjar*, *Dieng-mangala*, *Dieng-sohtang-pu*, Kh.

A small soft wooded evergreen tree; bark nearly white to dark grey, rugose, about .5 in. thick, soft and pale to greenish with brown strands inside. *Leaves* enormous up to 4 ft. long, tripinnate, rarely 4-pinnate; rachis often with a pair of leaflets at the nodes, dilated at the base; leaflets 3-5.5 by 1.5-3 in., elliptic, elliptic-ovate or lanceolate, usually short acuminate, entire; base often narrowed and unequal, glabrous, subcoriaceous; main lateral nerves 5-9 on either half, somewhat distant, arcuate, upper often meeting in intramarginal loops; petiolules almost 0.5 in. long. *Flowers* about .2 in. across, polygamous, yellow, fragrant, subsessile or shortly pedicellate in dense subglobose umbels, up to .7 in. across, racemed on the branches of an enormous panicle, 1.5-3 ft. long; flowers and inflorescence covered with more or less rusty, stellate scurf or tomentum. *Bracts* small, concave, persistent; pedicels short, up to .1 in. long, enlarging to .25 in. in fruit, not jointed below the flower. *Calyx* turbinate, nearly truncate. *Petals* 5, valvate, acute. *Stamens* 5, extruded, spreading. *Ovary* 2-celled; styles 2, distinct, persistent and recurved in fruit. *Fruit* compressed at right angles to the septum, .2-.3 by .3-.4 in., glaucous, ultimately glabrescent; endocarp crustaceous; seeds 2, orbicular, compressed with ruminated albumen.

All over the province ascending to about 3,500 ft. Eri silk worms are fed on the leaves.

Flrs. 12-1. Fr. 3-4.

The bisexual flowers are generally pedicellate and borne at ends

of panicle branches, the male flowers are subsessile and usually borne lower in smaller subcapitate umbels.

#### 7. ACANTHOPANAX Dene.

**Acanthopanax aculeatum** Seem. Vern. *Kenkut*, *Chobolaksinriube*, *Tako-laksim*, Miri; *Shi-soh-sat-khlaw*, *Shiah-ryng-khwari*, Kh.

A prickly straggling or scandent glabrous shrub. *Leaves* digitately 3-5 foliolate; common petiole 1-2·7 in. long, slender, often with 1 or more prickles; base stem clasping. *Leaflets* 1-4 by ·5-1·7 in., lanceolate to elliptic or oblanceolate, acuminate, unequally cuspidate-serrate or denticulate; base attenuated to the short petiolule, thin; main lateral nerves 5-7 on either half, slender, arcuate, sometimes with a few weak prickles on the upper surface; petiolules ·1-·25 in. long, margined. *Flowers* in globose umbels, which are solitary and axillary or terminal and arranged in corymbose or subumbellate panicles; bracts about ·1 in. long, concave, acute; peduncles ·7-2 in. long, not jointed; bracteoles many at the base of the pedicels. *Calyx-teeth* 5, small. *Petals* 5 or 4, lanceolate, acute, about ·1 in. long. *Stamens* as many as the petals. *Ovary* 2-celled; styles 2 at the apex of the conical disk, persistent, lower halves combined; upper halves free and ultimately recurved. *Fruit* ·2 in. across; albumen uniform.

N.-E. FRONTIER, LAKHIMPUR, DARRANG, SIBSAGAR, KHASI HILLS—ascending up to 4,000 ft.

Flrs. 11.

#### 8. BRASSAIOPSIS Dene and Planch.

Large shrubs or trees often armed. *Leaves* digitate or palmately lobed or angled; stipules connate within the petiole not prominent. *Flowers* often polygamous, pentamerous in umbels, which are arranged in large compound panicles, stellate tomentose at least when young; bracts often persistent; pedicels surrounded at the base by a dense cluster of persistent bracteoles, not jointed under the flowers. *Petals* valvate. *Ovary* 2-celled; styles united, long or short. *Fruit* broadly globose or turbinate, 2 or by abortion 1-seeded. *Seed* not compressed; albumen ruminate.

## I. Leaves digitately compound :—

Leaflets glabrate, entire or distantly serrulate; petiolules up to 2 in. long. . . . .

Leaflets thinly clothed with stiff stellate hairs, sharply serrate; petiolules short, up to .3 in. long. Prickles sharp. . . . .

1. *B. speciosa*.  
Var. *typica*.

2. *B. aculeata*.

## II. Leaves pinnately divided or angled :—

A. Leaflets serrate, undersurface thinly pubescent. . . . .

3. *B. mitis*.

B. Leaflets nearly entire, undersurface scurfy. . . . .

4. *B. palmata*.

C. Leaflets entire or serrate, woolly tomentose beneath. . . . .

5. *B. Hookeri*.

**1. *Brassaiopsis speciosa* Dcne. & Planch.** Vern. *Kurila* Ass.; *Dieng-lakor*, *La-tyng-krong*, *Dieng-la-tymphu*, Kh.; (a common Khasi name for all araliaceous plants with digitate leaves); *Tong-bahu*, Naga; *Thore*, Nep.

A small tree, upper parts of the stem and sometimes the inflorescence and common petioles prickly. *Bark* whitish-grey to greenish brown outside, green underneath the soft corky layer; blaze greenish-white or yellowish, pith large; young parts stellate-tomentose. *Leaves* digitate with usually 5-7 leaflets; common petiole 12-28 in. long. *Leaflets* 4-12 in. by 2-4.5 in., elliptic-oblong, lanceolate or ovate lanceolate, entire or distantly serrulate or crenulate when young, often with scattered stellate hairs above, glabrate with age; main lateral nerves 6-10 on either side, arching, prominent beneath; petiolules up to 2 in. long. *Panicles* large, terminal; bracts oblong or lanceolate; umbels many flowered, racemed on the branches of the panicle, which are up to 12 in. long, terminal umbel largest; lateral umbels on peduncles .5-1 in. long, often aborted; pedicels .5-.7 in. long with a dense cluster of small rusty-stellate hairy, persistent bracteoles at the base. *Flowers* white, small, stellate tomentose. *Disk* flat, obscurely 5-angled. *Fruit* .3-.4 in. across, often somewhat broader than long, subglobose (or didymo-globose—*C. B. Clarke in F. B. I.*) crowned by the disk and the persistent style. *Seeds* 1 or 2 with irregularly pitted surface; albumen uniform or nearly so.



Nearly all over the province ascending to 5,000 ft.

Flrs. 2-4. Fr. 12.

A variable species. The flowering forms may be mentioned.

(i) Var. *rufo-stellata* C. B. C. in F. B. I. Vern. *Arti-sam-phru*, Mik.; *Tembri-ching*, Naga; *Mithai-ju-phang*, Cach. - Leaflets with rounded base, denticulate-serrate with scattered rusty stellate hairs above, rusty villose beneath, when young; panicle densely rusty tomentose.

SIBSAGAR, CACHAR, KHASI HILLS.

(ii) Var. *serrata* C. B. C. in F. B. I. Vern. *Adi-tappor*, Miri. leaflets large, elliptic-lanceolate, dentate, serrate; base acute; panicle sparingly woolly—F. B. I.

N.-E. FRONTIER. The pith is sometimes used as cork for bottles.

## 2. *Brassaiopsis aculeata* Seem.

A very variable plant, usually a small tree armed with stout sharp prickles; branchlets thick; young shoots clothed with rusty brown tomentum and bristly hairs mixed. *Leaves* digitately 3-9 foliolate; common petiole 6-18 in. long. *Leaflets* 4-18 by 2-9 in., oblong, lanceolate or oblanceolate, acuminate, cuspidate-serrate or serrulate; base narrowed or acute, usually oblique, usually rounded on the outer half on the outermost pair, thin, glabrous above and thinly covered with pale stellate stiff hairs when mature; lateral nerves 8-14 on either half; petiolules up to 3 in. long. *Umbels* 1·2-1·7 in. across, racemed or solitary by abortion of lateral ones on the branches of a stout panicle. *Flowers* ·25-·3 in. across, yellowish green; pedicels ·3-·8 in. long, rusty, floccose, tomentose when young, arising from clusters of numerous hairy minute bracteoles. *Fruit* about ·2 in. across, subglobose or broadly turbinate.

KHASI HILLS about 4,000 ft.—Wah Nongksep, etc.

Flrs. 1-3. Fr. 5-6.

## 3. *Brassaiopsis mitis* C. B. Clarke?

A small tree with broad based short prickles; young parts and inflorescence densely covered with bristly hairs. *Bark* greenish grey, green under the corky layers; blaze greenish white, soft. *Leaves* near the tops of branches; 6-18 in. long across, deeply palmately 9-13 fid; segments oblong-lanceolate,

or somewhat narrowly lanceolate, acuminate, serrate, membranous, upper surface membranous, glabrescent when mature, thinly stellate pubescent beneath; petiole 6-18 in. long with persistent weak bristles at the top, otherwise nearly smooth with age; stipules-lower half adnate, upper half free, lanceolate-subulate, about .5 in. long. *Umbels* in large panicles below the bunch of leaves; bracts on the panicle branches .7 in. long, lanceolate, caducous; pedicels up to .7 in. long. • *Calyx* when young more or less stellate tomentose. *Petals* glabrous; disk large, subhemispheric. *Fruit* .2 in. across, globose (in Sikkim specimens in Calcutta Herbarium).

Myntang Valley -KHASI HILLS.

There is a single rather incomplete specimen in the Assam Herbarium (Sheet No. 6572); Watt No. 11470 Japvo, Naga Hills!

#### 4. *Brassaiopsis palmata* Kurz.

A small sparingly branched prickly tree; young petiole, undersurface of leaves and inflorescence tomentose with rusty stellate scurf. *Leaves* up to 15 in. across, deeply palmately 7-9 fid, almost (palmatisect in younger plants); segments lanceolate to elliptic lanceolate, central largest, narrowed towards the base, remotely toothed or nearly entire; petiole up to 15 in. long, unarmed; stipules with adnate basal portion and free upper portion which is subulate-lanceolate. *Panicles* large with branches up to 10 in. long; bracts short, concave, acute with a broad base, deciduous; umbels racemed on the panicle branches, upper largest; lateral peduncles .4-1 in. long; pedicels up to .5 in. long; bracteoles numerous, up to .2 in. long, lanceolate, pubescent. *Calyx* rusty tomentose outside, distinctly 5 toothed. *Fruit* crowned by the short style, ellipsoid, or when 2-seeded .5 by .4 in., turbinate, ellipsoid.

Dulong river, LAKHIMPUR.

Eri silk worms are fed on the leaves.

A flowering specimen collected by Mann in Nov. 78. in Khasi Hills at 4,000 ft., (locality not known) is probably this species. The leaf is almost digitately pedate with 7 segments with petiolules up to .7 in. long, joined together by a narrow rib at the apex of the petiole, probably the specimen was collected from a young plant?

Flrs. 3-4.

### 5. *Brassaiopsis Hookeri* C. B. Clarke.

A small prickly tree; young shoots, inflorescence, under-surface of leaves and petioles stellate woolly tomentose. *Leaves* digitately 3-5 foliolate; leaflets 4-18 in. long, oblong-lanceolate, acuminate or serrate or nearly entire; main lateral nerves about 8 on either half, deeply sunk above; petiolules .5-1 in. long. *Umbels* .6-1 in. across, in simple panicles; pedicels .25-.3 in. long. *Flowers* .2 in. across. *Calyx* lobes short. *Petals* scruffy-stellate.

KHASI HILLS Nunklow about 4,000 ft.—J. D. Hooker.

There are no specimens from our area in the Calcutta Herbarium.

### *Brassaiopsis Griffithii* C. B. Clarke.

A small tree about 20 ft. high; bark grey brown with short recurved thorns, pith large. *Leaves* palmatifid, 15-24 in. across, 7 lobed, half-way down, pubescent along the nerves, otherwise glabrous, cuspidate-serrate, sometimes doubly so, thinly coriaceous, pubescent along the nerves, otherwise glabrous; lobes ovate acute at the apex; petiole 12-15 in. long, ribbed. *Umbels* 1.2-1.8 in. across, borne on long axillary panicles; pedicels .6-.8 in. long, filiform, subscabrid; buds .2 in. across. *Calyx* limb distinctly toothed; disk conical. *Fruit* globose, .25-.3 in. across, crowned by the calyx teeth and the short remains of the style.

DUFFLA HILLS, Lister! Abor country Burkill!

### *Brassaiopsis hispida* Seem.

A shrub armed with prickles on the stem petiole and inflorescence; bristles numerous, close, stout and conical more or less deflexed, compressed and conical prickles and bristles mixed, the latter often falling off with age. *Leaves* 10-12 in. across, simple, deeply digitately 7-9 lobed; segments oblong-lanceolate; margins spinose serrate, glabrous above, thinly hispidulous or glabrescent beneath; petioles 8-16 in. long, stipules with two free linear points. *Flowers* about .25 in. across in umbels arranged in large panicles; panicle branches 3-4 in. long; bracts spatulate or lanceolate, tawny tomentose, up to .3 in. long; pedicels .5-.7 in. long, hispidulous. *Calyx* densely tomentose when young; petals about .15 in. long, lanceolate, at first scurfy-tomentose, glabrescent with age. *Fruit* not seen.

MISHMI HILLS. Griffith!

Differs from *B. mitis* by the numerous prickles on the stem spinose serratures of the leaves and more conspicuous nerves.

9. **MACROPANAX** Miq.

Small unarmed trees. *Leaves* digitate, 3-5 foliolate. *Leaflets* entire or serrate, glabrous; stipules connate within the petioles or 0. *Flowers* polygamous, pentamerous, umbelled in large panicles; pedicels articulate under the flowers. *Calyx* 5-toothed; petals valvate; stamens 5. *Ovary* 2-celled; styles united, persistent; disk large, often wider than the top of the fruit, broadly conical. *Fruit* striated or ribbed, but not angled. *Seeds* dorsally compressed, albumen rugose or ruminated.

Panicles rusty tomentose. . . . .	1. <i>M. oreophilum</i> .
Panicles glabrous. . . . .	2. <i>M. undulatum</i> .

**1. *Macropanax oreophilum* Miq.** Vern. *Pani-kesuri*, Ass.; *La-tong-krong*, Kh.; *Diengiarasi*, Synt.

A small or middle-sized evergreen tree. *Bark* grey, warty and somewhat rough, about .4 in. thick; blaze yellowish, turning brown aromatic; common petiole 5-14 in. long; base dilated and stem clasping; leaflets 3-6 by 1-3 in., lanceolate to elliptic-lanceolate-acuminate, denticulate or serrulate, glabrous or nearly so; main lateral nerves about 5-8 on either side, arcuate; petiolules .25-3 in. long. *Panicles* rusty-stellate tomentose; umbels racemed on the branches, up to .7 in. across, terminal largest, lower smaller, often deciduous; bracts small, narrow-lanceolate, acuminate, caducous, pedicels .1-.2 in. long, elongating in fruit, slender, minutely stellate pubescent; bracteoles few, deciduous; disk large, broadly conical. *Fruit* about .25 in. long, ovoid, crowned by the persistent style.

KHASI HILLS up to 4,000 ft., SIBSAGAR, Barpathar, Naojan, GOALPARA, Borjhar.

Flrs. 9-10. Fr. 2-3.

**2. *Macropanax undulatum* Seem.** Vern. *Dieng-jurasi*, *Dieng-la-ronsei*, Kh.; *Bon-keseru*, Ass.; *Phumber*, Lush.; *Thing-bo*, Mik.; *Sambrang*, Garo; *Mithaiju*, Cach.; *Thing-rem-te*, Kuki.

A small tree. *Bark* nearly smooth, pale grey, nearly white to greenish grey with large prominent raised lenticels;

blaze cream-coloured or white with pleasant mango-like smell. *Common petiole* 3·5-11 in. long. *Leaflets* 2·5-5 by ·7-2 in., oblong, elliptic or narrow-lanceolate, acuminate, margins entire or with fine distant teeth, glabrous, shining above, membranous; lateral nerves arcuate; petiolules ·3-2 in. long. *Panicle* glabrous, ascending; bracts caducous; pedicels ·1·2 in. long, elongating in fruit. *Fruit* as in the last species.

Practically all over the province, ascending to 3,000 ft., in the KHASI HILLS.

The gum exuding from wounds is also aromatic.

Flrs. 8-9. Fr. 2.

#### 10. TREVESIA Vis.

**Trevesia palmata** Vis. Vern. *Dieng-la-kor*, *Dieng-soh-kynthur*, Kh.; *Bhotola*, Ass.; *Chena-thong*, Garo; *Tung-jang-ko*, Kuki; *Khim-thao-ji-phang*, Kach.

Generally an unbranched tree armed with incurved short sharp prickles; young shoots rusty pubescent and very prickly. *Leaves* 12-24 in. across, roughly orbicular in outline, deeply palmatifid or palmatisect in young plants, sometimes digitate; lobes acuminate, serrate or irregularly, often unequally pinnately lobed, glabrous or nearly so, sub coriaceous; common petiole 12-24 in. long, densely prickly at the sheathing base, prickles few, absent upwards; stipules adnate. *Flowers* polygamous, white, ·6 in. across in umbels, which are corymbosely arranged in large deciduously rusty tomentose, terminal panicles; bracts about 1 in. long; pedicels 1·25-1·5 in. long. *Calyx* rusty-pubescent outside; limb free, membranous, undulate or unequally toothed. *Petals* 8-12, fleshy valvate, reflexed or cohering and falling off in a cap. *Stamens* and ovary cells as many as petals, the former erect. *Disk* flat; styles united in a short thick column. *Fruit* fleshy, ·5 in. across, crowned by the persistent style, glabrate; seeds compressed; albumen uniform.

KAMRUP, N. CACHAR HILLS, GARO HILLS, KHASI HILLS, ascending to 2,500 ft.

Flower buds are said to be eaten cooked by the Garos.

Flrs. 2-4. Fr. 5.

## 11. TUPIDANTHUS Hk. f. &amp; T.

***Tupidanthus calyptratus*** Hk. f. & Th. Vern. *Dieng-la-tyng-kung*, *Ja-lang-kum*, *Dieng-la-tyng-krong*, *Dieng-ja-la-tympoh*, Kh.

A small straggling or ultimately scandent tree, often epiphytic. *Bark* grey or greyish-brown, rough; blaze nearly white to dull-brown; young parts clothed with deciduous brown floccose tomentum. *Leaves* digitately 7-10 foliolate; common petiole 8-18 in. long; stipules connate within the petiole. *Leaflets* 4-9 in. by 1.2-3 in., oblong or oblong-lanceolate, shortly acuminate, narrowed at the base, entire, leathery, shining above; main lateral nerves subparallel, up to about 25, rather indistinct, with many intermediates; petioles .7-2.5 in. long. *Flowers* polygamous (?) in few flowered umbels arranged in panicles, which are often sub-umbellate or corymbose with stout branches; peduncles 1.5-2.7 in. long with leathery persistent concave bracts at the base, about 1 in. long; buds subglobose, .6-.8 in. across, pedicels stout, .5-1.2 in. long. *Calyx-tube* leathery, truncate or nearly so. *Petals* connate, falling off in a cap. *Stamens* many, about 50-70 (F. B. I.); filaments somewhat stout. *Ovary* many celled; stigmas many, sessile, radiating. *Fruit* succulent, 1-1.5 in. across; seeds numerous, thinly compressed, about .2 in. long.

KHASI HILLS, 3-5,000 ft.

Wood yellowish, hard for the family. The growing shoots abound in an aromatic resinous gum.

Flrs. 12-2. Fr. 4.

***Fatsia papyrifera*** Benth. The Chinese rice paper plant. A shrub or small tree. *Leaves* large, up to 19 in. across, palmate, 5-7 lobed, felted with greyish stellate tomentum beneath; petioles long. *Flowers* in paniced umbels.

Cultivated in Shillong.

The Chinese rice paper is manufactured from slices of the pith.

## FAM. 69. CORNACEÆ.

Trees or shrubs. *Leaves* extipulate, opposite or alternate, simple, entire or occasionally angled or lobed or serrate. *Flowers* small, regular, bisexual or unisexual. in axillary cymes, panicles or heads. *Calyx-tube* adnate to the ovary: limb persistent. truncate or 4-5 (sometimes many) lobed; lobes valvate or open in bud. *Petals* 4-5, sometimes 0, imbricate or valvate. *Stamens* inserted with the petals at the base of the epigynous disk, and usually equalling them, rarely twice or thrice as many. *Ovary* inferior, 1-4 celled, crowned by a usually fleshy sometimes inconspicuous disk; style simple; stigma capitate or divided; ovule usually solitary, rarely 2, pendulous from the apex of the cell. *Fruit* generally drupaceous with a 1-4 celled stone, less often with 2 pyrenes. *Seed* with copious albumen; cotyledons generally thin, leafy.

Flowers 2 sexual :

- |                              |                     |
|------------------------------|---------------------|
| Leaves opposite. . . . .     | 1. <b>Cornus.</b>   |
| Leaves alternate :           |                     |
| Petals long, linear. . . . . | 2. <b>Alangium.</b> |
| Petals small, ovate. . . . . | 3. <b>Mastixia.</b> |

Flowers 1-sexual :—

- |   |                      |
|---|----------------------|
| Trees. Flowers in axillary peduncled heads. . . . .                             | 4. <b>Nyssa.</b>     |
| Shrub. Flowers in umbels borne on the midrib of leaves or large bracts. . . . . | 5. <b>Helwingia.</b> |

### 1. CORNUS Linn.

Trees or shrubs. *Leaves* opposite, rarely alternate, entire. *Flowers* bisexual, white or yellow in branched usually dichotomous cymes or in involucrate heads. *Calyx-teeth* 4, usually small. *Petals* 4, oblong valvate. *Stamens* 4; anthers oblong. *Ovary* usually 2-celled with a solitary pendulous ovule in each cell; stigma capitate, sub-2-lobed. *Fruit* drupaceous, usually ovoid; endocarp hard, 2-celled, 2-seeded. *Seeds* oblong, compressed; albumen fleshy, cotyledons foliaceous.

Leaves opposite :—

Flowers in compound cymes; drupes free :—

Leaves narrow, oblong or lanceolate, pale green beneath. .. .. 1. *C. oblonga*.

Leaves broad-ovate or ovate-elliptic, whitish-grey beneath. .. .. 2. *C. macrophylla*.

Flowers in dense globose heads surrounded by large yellow or white petaloid bracts; drupes confluent. .. .. 3. *C. capitata*.

Leaves alternate. .. .. 4. *C. controversa*.

1. **Cornus oblonga** Wall. Vern. *Dieng-soh-long-law-synrang*, Kh.

A small tree. *Bark* reddish or dark-brown, lenticellate, rather rough outside, light red or cinnamon with pale streaks; young shoots minutely adpressed pubescent. *Leaves* sometimes a few alternate, 1-6 by 1-1.5 in., oblong or lanceolate-acuminate, subcoriaceous, glabrescent above or minutely adpressed hairy on both side, pale and somewhat glaucous beneath; lateral nerves 3-7 on either half, usually with tumid glands on the axils and sometimes on the axils of the smaller nerves; base narrowed; petioles .2-.6 in. long. *Cymes* branched, pubescent. *Flowers* pale-yellowish white. .3 in. across. *Calyx* short, campanulate, slightly hairy. *Petals* about .2 in. long, oblong, nearly glabrous outside. *Disk* and anthers purple. *Drupe* about .3 in. long, ovoid, black when ripe, crowned with the remains of the calyx tube and the disk; stone hard.

KHASI HILLS, 4,650 ft.

Fls. 9-12. Fr. 7.

2. **Cornus macrophylla** Wall. Vern. *Dieng-phait*. Khasi.

A medium sized deciduous tree. *Bark* rather rough grey to brown or reddish-brown outside, exfoliating in small polygonal or quadrangular plates in old stems; blaze white or pinkish, soon turning dark brown on exposure. *Leaves* rarely alternate, 8.5-6 by 1.5-4 in., ovate or ovate-elliptic, acuminate, sometimes lanceolate, subacute or sometimes cuneate, often unequal, glabrescent above, lower surface whitish-grey and adpressed pubescent; main lateral nerves



prominent beneath, 5-8 on either half, arcuate, joined by slender sub-parallel tertiaries; base rounded; petiole .5-1.7 in. long. *Flowers* yellowish-white or white in terminal much branched compact pubescent compound cymes arranged on corymbose panicles 2-4 in. across. *Calyx* .1 in. long, urceolate, clothed with white adpressed hairs. *Petals* .2 in. long, strap-shaped, minutely hairy outside. *Disk* prominent, annular. *Drupe* about .2-1 in. long, globose, crowned by the remains of the disk and the calyx tube, black when ripe.

KHASI HILLS, 5 6,000 ft.

Wood light pinkish white, but splits badly in seasoning, wt. 45 lbs. per c. ft.

Flrs. 4-5. Fr. 6-7.

Form a—(Sheet 5868) — A tree attaining 50 ft. *Leaves* alternate, lanceolate to elliptic-lanceolate, acuminate; base very cuneate; petioles up to 3 in. long, often reddish. May prove to be a good variety or subspecies but further examination in the field is necessary before separating it.

**3. *Cornus capitata* Wall. Var khasiana. Vern. Dieng-soh-japhon, Khasi.**

A small sized deciduous tree. *Bark* thin brownish grey or almost black, rather rough outside; blaze brown or reddish with deeper coloured streaks; young shoots with short adpressed hairs. *Leaves* approximate at the ends of branches, 2-4 by 1-1.7 in., oblong or elliptic, narrowed at both ends, coriaceous, pale beneath, glabrescent or thinly pubescent with adpressed hairs, specially beneath, nerves 3-5 on either side, arcuate; petiole .5 in. long, channelled with a broad base. *Flowers* .15 in. across, closely packed in globose heads, about .5 in. across, each of which is surrounded by 4 yellowish or white oblong-obovate, petaloid bracts, about 1-1.5 by .6-1 in. *Calyx-teeth* reflexed. *Petals* minute, oblong. *Fruits* coalescing into a red succulent globose head of drupes 1-2 in. across; stones hard, compressed, angular, about .15 in. long.

KHASI & JAINTIA HILLS - not common—5-6,000 ft.

The fruit is edible.

Flrs. 4-6. Fr. 9.

Scarcely separable from the type, which approaches the more hairy forms of our variety very closely.

**4. *Cornus controversa* Hemsl.** in Kew Bulletin 1909. P. 332.

A small tree; branchlets slender, brown, puberulous, glabrescent. *Leaves* alternate or subopposite, 3-6 by 2-3 in., ovate or elliptic to orbicular-acuminate; base rounded to broadly cuneate, membranous, usually or with few adpressed hairs above when young, glabrescent with age, glaucous beneath, sparsely adpressed pubescent with hairs fixed by the middle; primary nerves on either side, usually 5-8, conspicuous, arcuate; petiole slender, 1-2·7 in. long. *Cymes* compound, terminal, lax, up to 5·2 in. across; branches puberulous. *Flowers* white, about 4·5 in. across. *Calyx-tube* pilose with silvery hairs. *Petals* narrowly oblong, subobtus. *Stamens* slightly exceeding the petals. *Style* cylindric, glabrous. *Drupe* globose, 25-3 in. across, glabrescent, thinly adpressed-pubescent, apex excavate; stone 2-celled, longitudinally furrowed.

KHASI HILLS, 4-5,000 ft. MANIPUR extending to SIKKIM.

Closely allied to *C. macrophylla* from which it differs mainly by its alternate leaves. It may be regarded as the eastern form of the latter—never having been collected hitherto west of Sikkim.

Flrs. 4-5. Fruit 7.

**2. ALANGIUM Lamk.**

Trees or shrubs, sometimes spinous. *Leaves* alternate, entire or lobed, often unequal at the base. *Flowers* 2-sexual, in axillary cymes or fascicles; pedicels jointed. *Calyx-limb* 5-10 toothed or truncate. *Petals* 5-10. *Stamens* as many as the petals or twice or three times as many; filaments hairy at the base; anthers very long. *Ovary* inferior, 1-2 celled; stigma capitate. *Fruit* baccate, crowned by the calyx tube. *Seed* oblong.

Ovary 2-celled; ovules 1 in each cell.

.. 1. *A. begoniæfolia*.

Ovary 1-celled; ovules 2 in each cell.

.. 2. *A. barbata*.

**1. *Alangium begoniæfolia* Roxb.** Syn. *Marlea begoniæfolia* Roxb. Vern. *Dieng-mylliat-lap*, *Dieng-sla-doh*,

Synt.; *Dieng-sla-umpai*, *Dieng-sikhor-khla*, *Dieng-iang-sat-bieit*, *Dieng-sohkympe*, Khasi; *Phagrang*, Garo; *Chika-maruli*, *Chagali-gach*, *Bogamarulia*, *Bodi-dhili*, *Kodal-kania*, *Chorai-hara*, *Bangalmani*, *Chika-amrulia*, Ass.; *Marli*, Sylh.; *Taktong*, *Taktar-ragrong-asing*, Miri; *Rompab-arong*, *Thengjoy-arong*, Mik.; *Musa-mogon*, Mech.; *Bon-khan-khlu*, *Chersem-phang*, Kach.; *Thing-moi-te*, Kuki; *Sangkong-changne*, Duff.

A small rather straggling tree with grey or brown nearly smooth often warty bark; blaze white with green edges; young parts grey or brown silky, glabrous with age. *Leaves* simple, alternate, bifarious, 3-10 in. long, very variable in width, ovate-acuminate to suborbicular or broadly subquadrate, entire, angled or lobed; lobes often acuminate, glabrous above when mature, undersurface more or less pubescent along the nerves and with tufts of hair on the nerve axils, thin but tough; basal nerves 4-8; lateral nerves excluding the basal up to 4 on either half, all joined by intramarginal loops and by subparallel somewhat distant tertiaries; base usually oblique, truncate, cuneate or deeply cordate; petiole 1-1.5 in. long, grooved on the inner side, glabrescent or pubescent. *Flowers* white or cream coloured, .6-.9 in. long, bracteate, in axillary dichotomous usually compound and pedunculate cymes not exceeding the leaves; bracts linear; pedicels up to .2 in. long, pubescent, jointed towards the top. *Calyx* minutely toothed, covered with long scattered hairs. *Petals* 6-8, strap-shaped, puberulous. *Stamens* as many as and alternating with the petals; filaments short, covered with long silky hairs; anthers about .3 in. long and much exceeding the filaments; disk hemispheric. *Ovary* 2-celled; style up to .5 in. long. *Drupe* ovoid, dark purple when ripe, obscurely ribbed, about .3-.5 in. long, crowned by the calyx limb; stone 2-celled, 2-seeded.

Throughout the area ascending to about 4,000 ft. in the KHASI HILLS.

Flrs. 3-6. Fr. 6-9.

## 2. *Alangium barbata* R. Br. Vern. *Sal-biholom*, Syl.

A straggly small tree or large shrub with greyish-brown smooth bark; young parts, inflorescence and petiole shaggy

with spreading golden hairs which turn brownish with age. *Leaves* 5-9 by 3-4.5 in., obliquely ovate, acuminate, about 5-6 nerved, sometimes angled or obscurely lobulate, entire, membranous, thinly pubescent with rather long brownish hairs above, more densely beneath specially along the nerves; lateral nerves 5-7 on either half, nearly straight, more or less looping near the margin, joined by sub-parallel tertiaries; base subcordate; petioles .9-1.5 in. long. *Cymes* shorter than the leaves, dichotomous; bracts linear. *Calyx* small, shaggy with spreading golden hairs; teeth minute, lanceolate. *Petals* 5 or 6, linear oblong, hairy outside, .3-.5 in. long. *Filaments* short, hairy. *Disk* prominent, rather elongate, with as many grooves (at least in dry specimens) as stamens; style glabrous; stigma subclavate, 2-fid. *Drupe* .3-.4 by .2-.25 in., ovoid, thinly pubescent or glabrescent, slightly striated.

SYLHET, CACHAR Prazer, Deimara -A. C. Chatterji.

Flrs. and Fr. 12-5—most of the year?

**Alangium Lamarekii** Thwaites. Vern. *Akola*, Hind. A deciduous shrub or small tree; bark pale-brown. *Leaves* 2.5-6 by .7-2 in., alternate, simple, narrow oblong, entire. *Flowers* fascicled. *Calyx-lobes* 6-10, triangular, minute. *Corolla* woolly outside; petals 5-10, reflexed, linear. *Stamens* up to 30; filaments plumose at the base. *Ovary* 1-celled. *Drupe* .5-.75 in. long, globose or ellipsoidal.

Dhodar Ali (Sibsagar). Introduced from Bihar.

Flrs. 3-4. Fr. 5-8.

### 3. MASTIXIA Blume.

**Mastixia arborea** C. B. Clarke. Vern. *Bolong-jigri*. Garo.

A large tree. Bark brown or dark-brown with horizontal wrinkles, about .5 in. thick, tan brown, fibrous inside. *Leaves* alternate or opposite, 3-8 by 1.5-3.5 in., obovate-oblong or elliptic, bluntly, usually abruptly-acuminate, entire, narrowed at the base, glabrous, pale beneath; main lateral nerves 5-8 on either half, arched; nervules delicately reticulated between; petiole .5-1.5 in. long, minutely pubescent when young. *Flowers* green, 2-sexual, .25 in. across, in terminal pubescent panicles of cymes; bracts

about .15 in. long, triangular, acute; pedicels very short or 0, jointed below each flower, 2 bracteolate. *Calyx* campanulate, adpressed pubescent outside, .15 in. long; teeth 5, short, triangular, acute or lanceolate. *Petals* 5, valvate in bud, .1-.15 in. long, ovate acute, leathery, adpressed silky on both faces, more densely outside, with shallow ridge in the middle inside. *Stamens* 5, alternating with the petals. *Disk* fleshy, yellow, with several up to about 10 radiating grooves at the top. *Ovary* inferior, 1-celled, with a solitary ovule, pendulous from the wall of the ovary near its summit; style short, with a somewhat dilated base, obscurely ribbed. *Drupe* purplish-green, ovoid-ellipsoid, about 1.1-2 in. long; endocarp intruded laterally on one side. *Seed* ellipsoid.

LAKHIMPUR, GARO HILLS.

Flrs. 3-4.

**Mastixia rostrata** Bl. A shrub or a small tree. *Leaves* 2.5-5 by 1-3 in., subopposite or alternate, lanceolate or oblong, acute or acuminate, glabrous; lateral nerves 6-7 on either half, conspicuous underneath; midrib depressed above, prominent beneath; petiole .4-.6 in. long. *Corymbs* somewhat branched, lax, few flowered. *Stamens* 3. *Fruits* about 2 in. long, elongate-ovoid.

AKA HILLS (15160).

**Aucuba himalaica** Ilk. f. A large stout shrub or small tree, evergreen; young parts hairy. *Leaves* opposite, 4-8 by 1.2-2 in., lanceolate, long, acuminate, distantly serrate or denticulate; petiole .6-1 in. long. *Flowers* purplish, dioecious, in axillary hairy panicle fascicles. *Calyx* 4-toothed. *Petals* lanceolate, valvate. *Stamens* 4; disk fleshy, quadrangular. (*Calyx-tube* ovoid. *Ovary* 1-celled; stigma capitate; style short. *Berry* ellipsoid, crowned with the calyx, scarlet or orange, .5 in. long (Brandis).

AKA HILLS (15159), MANIPUR, BHUTAN (5-9,000 ft.).

#### 4. NYSSA Linn.

**Nyssa sessiliflora** Hk.f. Vern. *Gaharichopa*, Ass.

A large tree; young parts silky pubescent. *Bark* grey or brown, rather rough and warty with lenticels, about 1 in. thick; blaze light brown, mottled with darker brown, turning dirty brown on exposure. *Leaves* alternate, collected at the ends of the branches, 4-9.5 by 1.5-3 in., elliptic to

elliptic-ovate or oblong to elliptic lanceolate, acute or acuminate, narrowed or cuneate at the base, entire, membranous, closely punctate on both surfaces, glabrescent above, glaucous and thinly pubescent specially along the midrib and the nerves beneath; lateral nerves 13-17 on either half; petiole 1.1-5 in. long. *Flowers* green, unisexual, sessile, collected together in many bracteolate dense globose pedunculate heads; peduncles 1-2 in. long, axillary, *Male heads*: *Peduncles* sometimes bearing few flowered clusters below the head, less often branched. *Calyx-tube* solid, pedicel-like, about .2 in. long, pubescent. *Calyx-teeth* 5, rarely 6-7, short, subacute or rounded, ciliate. *Petals* as many as calyx lobes, imbricate in bud, elliptic or elliptic-oblong, silky pubescent outside, except on the margins. *Stamens* 10, alternately long and short. *Disk* fleshy, grooved, opposite the insertion of the stamens. *Female heads* on stouter and shorter peduncles than those of the male heads. *Calyx* campanulate, about .1 in. long; limb 5 toothed, deciduous. *Petals* 0; staminodes 0. *Ovary* 1-celled; ovule solitary, pendulous; style cylindric, short. *Berry* ovoid, glabrous; apex pointed, about .5 by .3 in.; seed with copious albumen.

LAKHIMPUR, SIBSAGAR, N. CACHAR HILLS, SYLIHET, KHASI HILLS up to 3,000 ft.

The timber is yellowish, fine grained and takes a good polish, weighing about 39 lbs. per c. ft. It is an important building timber in the Districts where it grows. Commercially it is known as "gohori-sopa"—a name which really applied to *Magnolia Griffithii*—probably from a superficial resemblance of the timber to those of "sopas" with which it is often substituted.

The tree coppices well.

Flrs. 4. Fr. 5. Nearly deciduous but never quite leafless.

C. B. Clarke in F. B. I and Brandis state that the heads have few female flowers and many male flowers. All the sheets in the Assam herbarium have unisexual flowers.

N. B.—*Nyssa javanica* Wenger also occurs in the area of the Flora.—R. N. De.

### 5. HELWINGIA Willd.

#### *Helwingia himalaica* Hk. f. & T.

A small glabrous usually epiphytic shrub. *Leaves* alternate, 2-6 by .7-1.5 in., lanceolate, long acuminate,

cuspidate-serrate, membranous; lateral nerves about 6 on either half, much arched; petiole .5-1.5 in. long, slender. *Flowers* minute, 1-sexual, in sessile umbels borne on the midrib of leaves about  $\frac{1}{3}$ rd of its length from the base or on the midrib of spatulate-oblong sessile bracts; pedicels slender, about .1 in. long. *Male umbels* with more numerous flowers. *Calyx* truncate. *Petals* and stamens 3-5. *Ovary* 3-4 celled; style combined at the base. *Fruit* sessile or nearly 1-3 together on the same leaf, .25-.3 in. long, red when ripe, 2-3 celled with furrows between the carpels. *Seeds* rugose, compressed; embryo minute in copious albumen.

KHASI HILLS—Mawphlang. C. B. Clarke! Shillong, C. B. Clarke.

Flrs. 4-5. Fr. 6-9.

*Helwingia lanceolata* Watt. Mss. in Herb. Cal. is hardly a different species. It is a smaller shrub with narrower leaves and fewer flowered umbels.

MANIPUR, NAGA HILLS.

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## ADDENDA.

Since the drafting of the original manuscript of this Volume, about eight years ago, a considerable number of literature has been published which contains description of new species and new records. It would have been very desirable to include and record all of them here, but as the printing of the present work was in progress, it has not been practicable to do so.

**Desmodium rufihirsutum** Craib. Vern. *Machrukimei*, Garo. (Leguminosæ-Papilionatæ).

An erect under-shrub. *Leaves* 6-12 in. by 3-8 in., ovate elliptic or elliptic, entire, ciliate, acuminate, rigidly chartaceous; lateral nerves 5-7 on either half; base rotundate, stipules subulate. *Racemes* dense flowered; peduncle short; flowers blue (Mr. N. E. Parry). *Calyx-tube* .05 in. long. *Vexillum* obovate, .3 in. long; alæ .12 in. long; carina .2 in. long; ovary .16 in. adpressed, pubescent; style .1 in. long.

GARO HILLS (Baghmara 500 ft.) MANIPUR.

Flrs. 11.

(Kew Bulletin 1936, p. 280).

**Desmodium oblongum** Wall (*Vide* page 61 of this Volume).

Also NAGA HILLS (3,000 ft.) S. LUSHAI HILLS (5,6,000 ft.).

Flrs. & Fr. 8-12.

(Kew Bulletin 1932, p. 198).

**Potentilla microphylla** Don. (Rosaceæ.)

A densely tufted dwarfish under-shrub with perennial woody root-stock, very variable in habit. *Leaflets* numerous,



small, oblong or rounded; petiole slender; stipule membranous. *Stamens* 30-40 *Achenes* in globose heads.

DELAI VALLEY (4000 ft.).

Flrs. & Fr. 6-9.

(Kew Bulletin 1932, p. 348., F. B. I. p. 352)

**Potentilla monanthes** Lindl. Var. *sibthortoides* Hk. f.

"A flat rosette plant on Alpine slopes"—stem filiform, prostrate. *Leaves* radical, .06-.25 in. broad. *Flowers* 25 in. across, axillary and sub-terminal; pedicels short; bracteoles narrow. *Calyx* pubescent, narrow. *Petals* bright-yellow. *Achenes* minute, numerous; receptacles globose, villous.

DELAI VALLEY (13,000 ft.).

Fls. & Fr. 7-9.

(Kew Bulletin 1932, p. 348., F. B. I. p. 358).

**Sorbus foliolosa** Spach. (Rosaceæ.)

A shrub 6 in. tall. *Leaflets* 7-11, 6.2 by 1.56 in. narrow, oblanceolate, long acuminate, entire, coriaceous, glabrous; lateral nerves 7-9, conspicuous; nervules obscure; base narrow, cuneate; petiolule .4 in. *Panicles* 8.2 in. long; flowers pentamerous. *Ovary* 5 locular.

Flrs. 9.

The following species of this genus are also recorded from Assam.

**Sorbus Expansa** Kœhne.

A shrub or small tree.

DELAI VALLEY (6000 ft.).

(Kew Bulletin 1932, p. 348).

**Sorbus Wenzigiana** Kœhne.

Flowers reddish crimson.

DELAI VALLEY (12-13,000 ft.).

Flrs. 6.

(Kew Bulletin 1932, p. 348).

**Photinia Wardii** C. E. C. Fischer. (Rosaceæ).

A large climber; branchlets purplish brown. *Leaves* 3.9 by 1.5-3.5 in., elliptic, acute, cuspidate, entire, coriaceous, almost glabrous; midrib impressed above, prominent below; lateral nerves 10-14 on either half; petiole 1.2 in. long, flocculant-tomentose when young; stipules caudate-lanceolate, early deciduous, tomentose. *Inflorescence* brachiate; corymbs somewhat flat-copped; flowers cream, very fragrant. *Calyx* glabrous, .1 in. long; tube funnel-shaped; segments 5, ovate, obtuse. *Petals* 5, oblong or sub-orbicular, obtuse, .2 in. long, glabrous. *Stamens* about 20, glabrous, slightly bigger than the petals. *Ovary* densely villous, 2-celled; style 2, free, glabrous. *Fruit* not seen.

Flrs. 4.

(Kew Bulletin 1936, p. 281).

**Saxifraga brachypoda** Don. (Saxifragaceæ).

A small herb. *Stem* simple. *Leaves* about .5 in. long, linear-lanceolate, half amplexicaul. *Flowers* solitary, terminal. *Calyx-segments* ovate, acute. *Petals* golden yellow, much exceeding the calyx.

DELAI VALLEY (12,-13,000 ft.).

Flrs. & Fr. 7-10.

(Kew Bulletin 1934, p. 91).

**Saxifraga diversifolia** Wall.

Herb, root-stock perennial, "stem leaves and inflorescence covered with crimson glandular hairs". *Radical leaves* large, ovate, sub-cordate, long petioled; cauline .8 in., ovate or broadly oblong. *Inflorescence* corymbose; flowers "bright yellow, closely spotted with ochre" (K. Ward). *Calyx* segments ovate, oblong, reflexed. *Petals* with 4-stalked glands at the base, much larger than the calyx segments. *Capsule* ovate-oblong; seeds angular; testa somewhat plaited.

DELAI VALLEY (11,-12,000 ft.).

Flrs. 8-10. Fr. Cold season.

(Kew Bulletin 1934, p. 91).

**Saxifraga hispidula** Don. Var. *Doniana* Engl.

A small herb in clumps; root-stock perennial and often woody; stem hispid. *Leaves* .3-.5 by .1 in., ovate-oblong, acute. *Flowers* bright-yellow. *Style* short. *Seed* sub-trigonal.

DELAI VALLEY (11,12,000 ft.).

Flrs. 7-10.

(Kew Bulletin 1934, p. 91).

The following species is also recorded from the region of the "Flora".

**Saxifraga sarmentosa** Linn.

DELAI VALLEY (6,7,000 ft.).

Flrs. 4.

(Kew Bulletin 1934, p. 91).

**Pottingeria acuminata** Prain. (Saxifraceæ).

A small shrub. *Leaves* ovate-lanceolate, rigidly coriaceous, glabrous 5-nerved at the base. *Flowers* in lateral cymes; capsule septicidally 3-valved; the 3 placentæ remain attached to the style when the capsule opens. (Brandis p. 299).

NAGA HILLS.

Flrs. 3.

(Kew Bulletin 1937, p. 474).

**Sonerila khasiana** C. B. Clarke. (Melastomaceæ).

Small herb with fibrous roots. *Stem* puberulous. *Leaves* fascicled at the apex, .7 by .2 in. ovate, ciliate, more or less crenate-serrate, usually acute with scattered bristly hairs above, rather more hairy beneath specially on the nerves; palmately 5-nerved with 2 more nerves arising a little higher and curving into the apex; base cordate; petiole .6-2.2 in. long, slender. *Inflorescence* terminal; flowers 1-7 in an umbel; bracteoles minute, linear-ensiform. *Calyx* .2 in. long, narrowed, turbinate, more or less trigonal. *Petals* mauve, broadly ovate, acute. *Stamens* equalling the petals;

filaments slender; anthers yellow. *Capsule* narrowly oblong, .3 in. long. *Seeds* minute, rather finely papillose, oblong.

KHASI & JAINTIA HILLS (3,500 ft. Mamloo, Jarain).

LUSHAI HILLS (4,000 ft.).

Flrs. 9. Fr. 9-11.

(Kew Bulletin 1932, p. 199).

***Sonerila tenera* Royle.**

Stem weak. \**Leaves* .25-.5 in. long, ovate, nearly entire, laxly hairy; petiole about .1 in. *Flowers* pale-pink. *Calyx* puberulous; teeth ovate, acute. *Petals* .1 in. long, rose-purple. *Capsule* trigonous, funnel-shaped, .25 in. long; seeds ovoid, smooth.

LUSHAI HILLS (3,400 ft.).

Flrs. 11.

(Kew Bulletin 1932, p. 199., F. B. I. p. 530).

***Sonerila villosa* C. E. C. Fischer.**

Small herb with creeping rhizome. *Stem* more or less white-villous. *Leaves* crowded at the apex of the stem, 1.4 by .8 in., broadly ovate to orbicular, rounded or narrowed and obtuse or sub-acute, minutely crenate-serrate; upper surface with scattered crisped hairs from bulbous bases; lower more softly hairy, more densely so on the nerves; palmately 5-nerved; base shallow-cordate; petiole 1.5 in. long, slender, more or less white-villous. *Inflorescence* terminal; flowers solitary or 2-3; bracts 1-3, minute. *Calyx* .16 in. long, narrowly turbinate, white, villous; teeth small, triangular, acute. *Petals* more or less elliptic, .25 in. long. *Stamens* slightly exceeding the petals; anthers alternate, deep yellow. *Capsule* .25 in. long, smooth, truncate campanulate.

LUSHAI HILLS (2,500-4,000 ft.).

Flrs. & Fr. 7-8.

(Kew Bulletin 1932, p. 200).

***Begonia Wengeri* C. E. C. Fischer. (Begoniaceæ).**

Herb with small fibrous root stock. *Leaves* .7-2.2 in. in diameter, rotund-ovate, inequilateral, acute, simply or doubly

crenate with cilia between the crenatures and sometimes at their apices, dark green and sparsely hairy above, pale below; 7-8 nerved; base shallow-cordate; petiole slender, 2 in. long, hairy; stipule ensiform, acuminate. *Female-flowers* perianth segments 4, white; outer broadly ovate-obtuse; inner smaller, sub-acute. *Stamens* about 12, twisted below. *Male-flowers* perianth segments 5, white. *Ovary* trigonous .16 in. long; styles 4, shortly united at the base; stigma densely fuscous-hairy. *Capsule* 3-winged, .4 in. long; seeds brown, minute, oblong-ellipsoid.

LUSHAI HILLS (1,500-2,000 ft.).

Flrs. & Fr. 8.

(Kew Bulletin 1932, p. 200).

The following species are also recorded from Assam; but for want of specimens and literature could not be fully described.

**Uraria hispida** Schindl. (Leguminosæ-Papilionateæ).

A shrub. *Flowers* pink.

NAGA HILLS (Themokedema, 4,500 ft.) (N. L. Bor, 6173).

Flrs. 9.

(Kew Bulletin 1937, p. 474).

**Pueraria Yunnanensis** Franch. (Leguminosæ-Papilionateæ).

A climber in thickets and clearing along the edge of the jungle. *Flowers* white, tipped with violet.

LOHIT VALLEY (3,500 ft.).

Flrs. 10.

(Kew Bulletin 1932, p. 198).

**Rubus pectinarius** Focke. (Rosaceæ).

A creeping plant with erect flowering shoots forming a loose carpet on open slopes.

DELAH VALLEY (10,11,000 ft.).

Flrs. 8.

(Kew Bulletin 1932, p. 348).

**Deutzia purpurascens** (Hk. f. & T.) Engl. (Saxi-fragaceæ).

A long branched bushy shrub. *Flowers* pale-pink.

DELAI VALLEY (9,-10,000 ft.).

Flrs. 6.

(Kew Bulletin 1934, p. 90).

**Oxyspora serrata** Diels. (Melastomaceæ).

A shrub. *Flowers* mauve.

NAGA HILLS (6,000 ft.).

Flrs. 7.

(Kew Bulletin 1937, p. 474).

**Sanicula hacquetoides** Franch. (Umbelliferæ).

Flowers white and mauve.

Abundant in Alpine Region. **Delai Valley** (11,-13,000 ft.).

(Kew Bulletin p. 91).

**Schefflera shweliensis** W. W. Smith. (Araliaceæ).

Medium-sized or small much branched tree having the appearance of a clump of palms.

NAGA HILLS, MANIPUR, DELAI VALLEY.

(Kew Bulletin 1934, p. 91).

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(*Ass.* means Assamese; *Beng.* Bengali; *Cach.* Cachar or Cachari; *Duff.* Daffla; *Kach.* Kachari; *Kh.* Khasi; *Lush.* Lushai; *Manip.* Manipur; *Mik.* Mikir; *Nep.* Nepali; *Sans.* Sanskrit; *Syl.* or *Sylh.* Sylhet; *Synt.* Synteng; *Tipp.* Tippera; *Eng.* English).

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